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PROCEEDINGS

OF THE

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AMERICAN SOCIETY

OF

CIVIL ENGINEERS

VOL. XXXVIII—No. 6

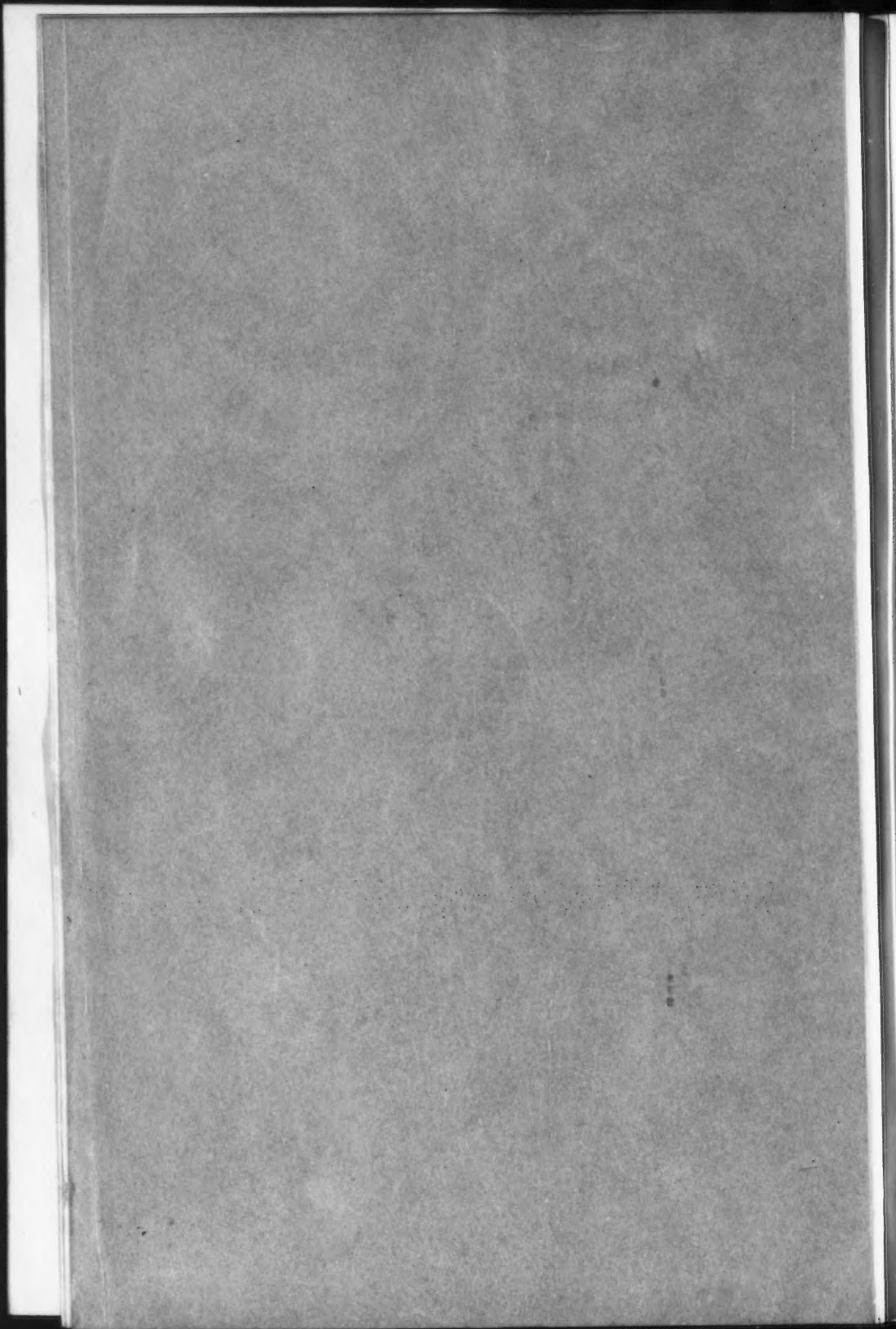


August, 1912



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PROCEEDINGS
OF THE
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OF
CIVIL ENGINEERS

(INSTITUTED 1852)

VOL. XXXVIII—No. 6
AUGUST, 1912

Edited by the Secretary, under the direction of the Committee on Publications.

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NEW YORK 1912

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The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER.....5913 Columbus.
CABLE ADDRESS....."Ceas, New York."

AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed
in its publications.

SOCIETY AFFAIRS

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MINUTES OF MEETINGS

OF THE SOCIETY

May 15th, 1912.—The meeting was called to order at 8.30 P. M.; Vice-President Charles S. Churchill in the chair; T. J. McMinn, Assistant Secretary, acting as Secretary; and present, also, 145 members and 17 guests.

A paper by J. V. Davies, M. Am. Soc. C. E., entitled "Air Resistances in Tube Tunnels," was presented by the author who introduced his Assistant, Mr. B. S. Murphy, to explain the details of the experiments and to illustrate them with lantern slides. The paper was discussed orally by Messrs. George Gibbs, Charles S. Churchill, and T. Kennard Thomson. The Assistant Secretary read a written communication on the subject by George H. Pegram, M. Am. Soc. C. E.

The Assistant Secretary announced the following death:

STEPHEN SAMUEL HAIGHT, elected Member, June 1st, 1881; died May 1st, 1912.

Adjourned.

June 5th, 1912.—The meeting was called to order at 8.30 P. M.; Director T. Kennard Thomson in the chair; T. J. McMinn, Assistant Secretary, acting as Secretary; and present, also, 105 members and 9 guests.

The minutes of the meetings of April 17th and May 1st, 1912, were approved as printed in *Proceedings* for May, 1912.

A paper by C. E. Grunsky, M. Am. Soc. C. E., entitled "The Appraisal of Public Service Properties as a Basis for the Regulation of Rates," was presented by title by the Assistant Secretary, who also read communications on the subject from Messrs. James V. Oxtoby and W. B. Bamford. The paper was discussed orally by Messrs. Charles H. Higgins, Henry Floy, W. J. Boucher, R. D. Coombs, J. Martin Schreiber, and A. H. Van Cleve.

The Assistant Secretary announced the election of the following candidates on May 28th, 1912:

AS MEMBERS

JOHN EDWARD CARTY, Boston, Mass.
THOMAS MARK HURLBURT, Portland, Ore.
JAMES WELBY MADELEY, Madras, India
GEORGE ADEE MEADE, Flint, Mich.
JAMES PAUL MORRISSEY, Rochester, N. Y.
CHARLES FRANCIS MORSE, Wallkill, N. Y.
JAMES GEORGE ROSS, Memphis, Tenn.
FRANK MARTIN WILLIAMS, Goshen, N. Y.

AS ASSOCIATE MEMBERS

CHARLES FELIX BARTHOLOMEES, Kansas City, Mo.
WILLIAM LITTELL BRADLEY, Fresno, Cal.
JOSEPH SHIRLEY BRIGHT, San Bernardino, Cal.
JOSEPH MILLER BURKETT, Twin Falls, Idaho
ALBERT HASKELL CLOUGH, San Francisco, Cal.
JOHN LESLIE DOBBINS, Tientsin, China
ANDREW TRAVERS EWELL, Tirapata, Peru
DONALD BARRY FEGLES, St. Paul, Minn.
BURTON PERCIVAL FLEMING, Iowa City, Iowa
CHARLES KIRBY FOX, Ft. Bidwell, Cal.
CARSON GEYER FRENCH, Chicago, Ill.
BEN CLIFFORD GERWICK, San Obispo, Cal.
SAMUEL ROLAND GINSBURG, La Romana, Dominican Republic

CHARLES AUGUSTUS HANDEYSIDE, Manhattan, Kans.
WILBUR SHERFEY HANNA, Harlem, Mont.
HORACE ALDEN HILTON, Portland, Me.
CARL AUGUST HOGLUND, Kansas City, Mo.
HOWARD WHITTIER HOLMES, Portland, Ore.
ROBERT CHESTER HOWARD, Tyler, Fla.
ELMER THOMAS HOWSON, Chicago, Ill.
HARRY LUTHER HURD, White Plains, N. Y.
PATRICK JAMES KENNEDY, Holyoke, Mass.
WILLIAM HENRY KERSHAW, Bridgeport, Conn.
SAMUEL KLEIN, Chicago, Ill.
JAMES MUIR LAWRIE, London, England
CAMILLE MAZEAU, Brooklyn, N. Y.
NORMAN T OLSON, Helena, Mont.
HAROLD AUS PETTERSON, San Francisco, Cal.
ROBERT HAVELOCK ROBSON, Tallulah Falls, Ga.
WARD PERRY WEBBER, Wapato, Wash.
CHARLES HANCOCK WOOD, Albany, N. Y.

AS ASSOCIATES

BENJAMIN BUTLER FRANKLIN BYERS, New Martinsville, W. Va.
KENNETH GERARD MACKENZIE, Bayonne, N. J.

AS JUNIORS

RUSSEL THOMAS BAILEY, Branson, Mo.
RALPH ROBERT BENEDICT, Kansas City, Mo.
JOHN RUSSELL DERRICK, Bluefield, W. Va.
JANIK KEVORK DIRATZOUYAN, Oklahoma City, Okla.
JOHN CHRISTOPHER HASKINS, Louisville, Ky.
GEORGE RAYMOND HAWES, Spokane, Wash.
TAO KING, Shanghai, China
HARMONY LEONIDAS LAUGHLIN, Medicine Hat, Alta., Canada
WILLIAM HARRISON MORRISON, Jr., Albany, N. Y.
PERCY HAROLD PAGE, Rutherglen, Scotland
CHARLES FILLMORE RUSSELL, Jena, La.
CHARLES MORRISON SCUDDER, Madison, Wis.
GUY RAY SHAW, Des Moines, Iowa
HENRY MITCHEL WEITZNER, New York City

The Assistant Secretary announced the transfer of the following candidates on May 28th, 1912:

FROM ASSOCIATE MEMBER TO MEMBER

RAYMOND EDMOND ADAMS, Washington, D. C.
FREDERICK WHITNEY ADGATE, Chicago, Ill.

FREDERICK WILLIAM ALTSTAETTER, Wheeling, W. Va.
WILLIAM WHITLOCK BRUSH, New York City
FREDERICK STUART GREENE, New York City
THOMAS GORDON JANNEY, Redding, Cal.
JOHN EDWARD KEMP, Kewanee, Ill.
FRANK IRWIN LOUCKES, Louisville, Ky.
EDWARD HENRY ROCKWELL, Tufts College, Mass.
SAMUEL PALMER SENIOR, Bridgeport, Conn.
JOHN CYPRIAN STEVENS, Barcelona, Spain

FROM JUNIOR TO ASSOCIATE MEMBER

RUDOLPH CONRAD BECKER, New York City
CLINTON LATHROP BOGERT, New York City
THEODORE DELONG COFFIN, Katonah, N. Y.
AUGUSTUS GRIFFIN, Modesto, Cal.
JOSEPH EMMETT HALL, Indianapolis, Ind.
HARRY SPEAR HARDING, New York City
CLIFTON EWING HICKOK, Bull Run, Ore.
WALTER JOSEPH KNIGHT, St. Louis, Mo.
ROBERT HALL MERRILL, Medina, N. Y.
JOHN PRINCE HAZEN PERRY, New York City
LEON MORLEY PILL, Birmingham, Ala.

FROM JUNIOR TO ASSOCIATE

SMITH TOMPKINS HENRY, Cleveland, Ohio
THOMAS PATRICK BERCHMANS KENNEDY, Albany, N. Y.

The Assistant Secretary announced the following death:

WILLIAM MADISON MYERS, elected Associate Member, October 3d,
1906; died April 4th, 1912.

Adjourned.

**FORTY-FOURTH ANNUAL CONVENTION,
HELD IN SEATTLE, WASH., JUNE 25TH-28TH, 1912**

Preceding the regular Convention meetings, on the evening of Monday, June 24th, 1912, Maurice D. Leehey, Esq., of Seattle, addressed a well-attended meeting on Alaska. The address was illustrated with lantern slides.

FIRST SESSION*

Tuesday, June 25th, 1912.—The meeting was called to order at 9 A. M.; President John A. Ockerson in the chair; Chas. Warren Hunt, Secretary; and present, also, about 175 members and guests.

By the President's request, S. H. Hedges, M. Am. Soc. C. E., Chairman of the Local Committee of Arrangements, introduced Mr. George A. Lee, Chairman of the Public Service Commission of the State of Washington, the Honorable George F. Cotterill, Mayor of Seattle, and Mr. J. W. Spangler, Secretary of the Clearing House Association, who addressed the meeting and welcomed the members to the City of Seattle and the State of Washington.

The President delivered the Annual Address.†

Adjourned.

SECOND SESSION

Tuesday, June 25th, 1912, 8 P. M.—President John A. Ockerson in the chair; Chas. Warren Hunt, Secretary; and present, also, about 150 members and guests.

A paper on "The Harbors of the Pacific Coast," by H. M. Chittenden, M. Am. Soc. C. E.,‡ was, owing to the indisposition of General Chittenden, presented by A. O. Powell, M. Am. Soc. C. E., and was discussed by Jay J. Morrow, M. Am. Soc. C. E., and F. C. Finkle, Esq.

President Ockerson then introduced Mr. Asahel Curtis, Chairman of the Committee on Improvement of Roads of Rainier National Park, who gave a very interesting lecture, and showed many beautiful lantern slides of Mt. Rainier and the Park.

Adjourned.

THIRD SESSION. BUSINESS MEETING.§

Wednesday, June 26th, 1912.—The meeting was called to order at 9 A. M.; President John A. Ockerson in the chair; Chas. Warren Hunt, Secretary; and present, also, about 100 members.

* For the report in full of this meeting, see page 337.

† See page 909 of Papers and Discussions.

‡ It is expected that this paper will be published in a subsequent number of *Proceedings*, and discussion on the subject invited.

§ For the Report in Full of the Business Meeting, see page 347.

The Secretary presented a report on the suggestions of members as to the Time and Place for holding the Annual Convention of 1913.*

On motion, duly seconded, the matter of the selection of the Time and Place for holding the next Annual Convention was referred to the Board of Direction, with power.

The Secretary presented the report of the Board of Direction relating to the following resolution which was referred to the Board by the Annual Meeting, January 17th, 1912:

"That the President appoint a Committee of eight members to look into the conditions of employment of Civil Engineers throughout the country, the compensation they receive, the duration of employment, the expenses for which they are reimbursed by the employer, the expenses due to the work paid by the engineers themselves, the net yearly income, the prices charged for different classes of private work, and any other facts necessary to clearly set forth the problem. The report to set forth recommendations for action by the Society looking toward improving existing conditions and to include a report on the feasibility of this Society operating an employment bureau for its members covering all classes of engineering work. The Committee to consist of four employing engineers and four engineers holding subordinate positions. The Committee to be authorized to add to its membership and to fill vacancies. A preliminary report to be rendered in six months."

The following is the report of the Board:

"The Board of Direction has carefully considered the above motion, and begs leave to report as follows:

"(1) That it does not feel that it would be practicable or wise for the Society to operate an employment bureau for its members.

"(2) That it feels that it would be of valuable interest to the Society to know the conditions of employment and the compensation of Civil Engineers throughout the country.

"3. That it therefore recommends to the Business Meeting of the Convention that the matter be referred back to the Board with instructions to appoint a Committee to investigate the conditions of the employment of, and the compensation of, Civil Engineers throughout the country; to collect statistics and data in regard thereto, and to report the results of such investigation to the Society."

On motion, duly seconded, the recommendations of the Board were adopted.

The Secretary presented a letter from Charles Kirby Fox, Assoc. M. Am. Soc. C. E., suggesting the appointment of a Special Committee on Irrigation Affairs.

On motion, duly seconded, the matter was referred to the Board of Direction for consideration.

The consideration of a proposed amendment of Article VII of the Constitution was then taken up.†

* See page 347.

† See page 351.

The proposed amendment was discussed, in detail, and was amended to read as follows:

"Strike out Article VII and substitute the following:

"ARTICLE VII.—NOMINATION AND ELECTION OF OFFICERS.

"1.—The Board of Direction shall, from time to time, divide the territory occupied by the membership into seven geographical districts, to be designated by numbers. District No. 1 shall be the territory within fifty miles of the Post Office in the City of New York. Each of the other districts shall be, as nearly as practicable, contiguous territory on State or Territorial lines; each shall contain, as nearly as practicable, an equal number of members, and they shall be designated as Districts Nos. 2, 3, 4, 5, 6, and 7. The Board shall announce such division to the Society on or before the first day of March in each year.

"2.—At the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts, shall be appointed by the meeting to serve for two years; who, with the seven members holding over and the five living last Past-Presidents of the Society, shall be a committee to nominate officers for the Society.

"The Board of Direction may prescribe the mode of procedure for appointing this committee, and fill any vacancies occurring.

"This committee shall meet at the Annual Convention of the Society, or at a time and place to be agreed upon by a majority of its members, but said meeting shall not be later than the fifteenth day of July. At this meeting this committee shall elect from among its members a Chairman and a Secretary to serve for one year beginning on the first day of the following September. At all meetings of the committee eight members shall constitute a quorum. If at any stated or called meeting of the committee there shall not be a quorum present, then such members as are present shall call an adjourned meeting for the transaction of the committee's business. This committee shall select nominees to fill the offices named in Article V, with the exception of the office of Secretary, so as to provide, with the officers holding over, a Vice-President and six Directors, residing in District No. 1, and twelve Directors divided equally, with regard to number and residence, among the remaining districts, Nos. 2, 3, 4, 5, 6, and 7. In case any nominee or officer shall change his residence from one district to another, he shall continue to represent the district in which he resided when nominated. Nominations under this section shall be designated as 'Official Nominations.'

"A list of the nominees selected for the offices to be filled at the next Annual Election shall be presented by this committee to the Board of Direction not later than the first day of August, and the Secretary shall thereupon immediately notify each nominee of his nomination and ascertain his acceptance or declination.

"3.—Directly after the first day of October the aforesaid list of nominees shall be mailed to every Corporate Member whose address is known, provided that if any person shall be found by the Board of Direction to be ineligible for the office for which he is nominated, or should a nominee decline such nomination, his name shall not be sent out, but the Board shall substitute another name therefor, and further

provided that in the event that the Nominating Committee fails to select a nominee for any office as above stipulated, the Board shall select a nominee therefor. The Board shall also fill any vacancies that may occur in this list of nominees up to the time the ballots are sent out. Vacancies shall be so filled as to preserve the geographical distribution of officers prescribed in Section 2 of this Article.

"4.—Additional nominations complying with Section 2 of this Article regarding the distribution of nominees among the several districts may be made by declaration, provided such declaration is accompanied by an acceptance of the nomination signed by the nominee, and is filed with the Secretary before the first day of December, and further provided that each declaration shall be signed by at least twenty-five Corporate Members. Nominations made in accordance with this Section shall be known as 'Nominations by Declaration.'

"5.—At least thirty days before the Annual Meeting, there shall be mailed to every Corporate Member whose address is known a letter-ballot with envelopes for voting. This ballot shall include the names and residences of all persons nominated in accordance with this Article, their grades of membership, and, in the case of nominees for Directors, the number of the district in which they reside. Under the names of the nominees for each office so printed there shall be provided a space for the use of the voter if he desires to substitute another name. Nominations by Declaration shall be distinguished from Official Nominations by some convenient mark or words. There shall also be printed on the ballot the names of the Nominating Committee as created by Section 2 of this Article, with the numbers of the districts which the appointed members represent, and also in a separate list thereon the names and residences of the signers of each Nomination by Declaration.

"Voters may strike out the name of any nominee printed on the ballot for whom they do not wish to vote, and may substitute therefor, in writing or by paster, the name of any person eligible for the office; but the number of names voted for for any office shall not exceed the number of persons to be elected to such office. Ballots not complying with these provisions shall be rejected.

"Directions in accordance with these provisions shall be issued with the ballots.

"6.—Ballots may be sent by mail to the Secretary, or may be presented to him at the Society House. They should be enclosed in two sealed envelopes, and the outer envelope shall be endorsed by the voter's signature.

"The Secretary shall make a list of the voters from whom ballots are received, which list shall be open to inspection by all Corporate Members. A voter may withdraw his ballot, and may substitute another, at any time before the polls close.

"7.—The polls shall be closed at 9 A. M. on the first day of the Annual Meeting, and the ballots shall be canvassed publicly by tellers, who shall be appointed by the presiding officer.

"The persons who receive the largest number of votes for each office to be filled shall be declared elected.

"In case of a tie between two or more persons for the same office, the Annual Meeting shall elect the officer from among the persons so tied.

"The presiding officer shall announce to the meeting the names of the officers elected."

F. H. Fay, M. Am. Soc. C. E., presented the following resolution:

"Resolved, That the Board of Direction be requested to authorize the payment of mileage to members of the Nominating Committee in attendance at the prescribed meetings of said committee, on the same basis as is authorized by the Board for the mileage of its own members attending Board meetings. This action to take effect January 1st, 1913."

On motion, duly seconded, this resolution was amended by striking out the last sentence relating to the date.

On motion, duly seconded, the resolution, as amended, was adopted.

Reports from Special Committees were called for, but none was submitted.

On motion, duly seconded, thanks were returned to the Local Committee and the Pacific Northwest Association for the entertainment provided for the visiting members.

Adjourned.

FOURTH SESSION

Wednesday, June 26th, 8 P. M.—The meeting was called to order. President John A. Ockerson in the chair; Chas. Warren Hunt, Secretary; and present, also, 150 members and guests.

William L. Mulholland, M. Am. Soc. C. E., gave a lecture, on the Los Angeles Aqueduct, illustrated with lantern slides.

This was followed by a repetition of Asahel Curtis' Mt. Rainier Views, with variations.

Adjourned.

FIFTH SESSION

Thursday, June 27th, 9 A. M.—The meeting was called to order. President John A. Ockerson in the chair; Chas. Warren Hunt, Secretary; and present, also, 100 members and guests.

A paper entitled "Economies in Water and Design of Works, Possible by Avoidance of Excessive Seepage Losses," was presented by E. G. Hopson, M. Am. Soc. C. E., and discussed by Messrs. J. C. Ralston, and C. T. Purdy.

A paper by John H. Lewis, Assoc. M. Am. Soc. C. E., entitled "State and National Water Laws," was presented by title.*

Adjourned.

* The paper by Mr. Lewis, in more extended form, is now being prepared for publication by the Society.

ELECTIONS AND TRANSFERS BY THE BOARD OF DIRECTION
JULY 9TH, 1912

ELECTED AS MEMBERS

CHARLES HOPKINS BYERS, Seattle, Wash.
JOHN ANGUS GILES, Binghamton, N. Y.
JAMES BELL GIRARD, Phoenix, Ariz.
CHARLES SEYMOUR KIMBALL, Washington, D. C.
GEORGE CASPER DOERING LENTH, Chicago, Ill.
HARRISON CURTIS MOWER, Tuscaloosa, Ala.
HENRY ZENAS OSBORNE, Jr., Los Angeles, Cal.
HENRY JOHN SHERMAN, Camden, N. J.
CHARLES HENRY STEIN, Jersey City, N. J.

ELECTED AS ASSOCIATE MEMBERS

ROWAN AYRES, Patzcuaro, Michoacan, Mexico
EDGAR E BALL, Winslow, Ariz.
DANIEL ROGERS CATE, Sacramento, Cal.
PERCY GORDON COOPER, Washington, D. C.
FREDERICK N CRONHOLM, Sunnyside, Wash.
GEORGE GALE DIXON, New Paltz, N. Y.
FRITZ EHRSAM, New York City
FREDERICK WILLIAM FISHER, Rochester, N. Y.
CHARLES MILLER FRANKLIN, New York City
HALSEY FRENCH, Brooklyn, N. Y.
HARRY EDGAR GREEN, Waterville, Me.
JOHN ALDEN GRIFFIN, Los Angeles, Cal.
CARL PORTER HOFF, St. Joseph, Mo.
THOMAS HOVENDEN, Philadelphia, Pa.
HENRY LESER, New York City
AARON GRETZNER LEVY, New Orleans, La.
HENRY DELANO LORING, Madisonville, Ohio
HAROLD CHANDOS LYONS, New York City
HANS MUMM, Jr., Everett, Wash.
FRED ELMER MURPHY, New York City
ARTHUR SOUTHWICK PAGE, Waterville, Me.
WILLIAM ELWOOD PEASE, Cleveland, Ohio
WILLIS RANNEY, Mico, Tex.
CHARLES EZEKIEL RASINSKY, Cincinnati, Ohio
ROBERT BRUCE ROBINSON, Rupert, Idaho
EDSON OLIVER SESSIONS, Chicago, Ill.
FRANCIS SILVERTON, Vancouver, B. C., Canada
HUNTINGTON SMITH, Cleveland, Ohio
WILLIAM EDMUND STONEY, Gatun, Canal Zone, Panama
CHESTER ANTRIM TAYLOR, Indianapolis, Ind.

GUSTAVUS WILLIAM THOMPSON, Utica, N. Y.
CARL PERKINS TOMLINSON, Bellingham, Wash.
PHILIP SCOTT TYRE, Philadelphia, Pa.
ARTHUR WARD VERHAREN, Helena, Mont.
FREDERICK ALLEN WILKINSON, Santiago de Cuba, Cuba
OSCAR AMBROSE ZIMMERMAN, Leavenworth, Kans.

ELECTED AS ASSOCIATES

ROBERT HILL, Connellsville, Pa.
HALE HOUSTON, Clemson College, S. C.

As JUNIORS

THOMAS ABBOTT BALDWIN, Harrisburg, Pa.
FRANK JACKSON BLYTHE, Hunterville, N. C.
WALTER VAN BUCK, Manhattan, Kans.
FRANK GARY EASON, Charleston, S. C.
GEORGE RODMAN GOETHALS, Culebra, Canal Zone, Panama
WALTER GARDINER HARRINGTON, New York City
CHARLES JACOB HYER, Tampa, Fla.
CHARLES HYLAND JONES, New York City
HAROLD DANE L'AMOUREUX, Pawtucket, R. I.
ROYAL UPSON ST. JOHN, Suisun, Cal.
HENRY LEWIS TUCKER, Pittsburgh, Pa.
HARRY STRONG WINN, St. Louis, Mo.
HAROLD IRA WOOD, Oakland, Cal.

TRANSFERRED FROM ASSOCIATE MEMBER TO MEMBER

LOUIS EDWARD BOGEN, Milwaukee, Wis.
SHERMAN WORCESTER BOWEN, St. Louis, Mo.
JOHN SEVERIN BRANNE, New York City
HARLEY EDGAR FRYE, Zanesville, Ohio
CHARLES EUGENE JOHNSTON, Kansas City, Mo.
EDGAR GLEIM MACLAY, Houston, Tex.
COLONE WILL JACKSON NEVILLE, New Orleans, La.
LLOYD BROWN SMITH, Topeka, Kans.
RALPH CONE TAGGART, New York City

TRANSFERRED FROM JUNIOR TO ASSOCIATE MEMBER

EMIL LEONARD LUNDGREN, Manila, Philippine Islands
STEPHEN WOOD MCCLAVE, JR., Cliffside Park, N. J.
HERBERT DRUMMOND MENDENHALL, Lakeland, Fla.
JAMES HAMPDEN SMALL, JR., New York City
JOSEPH UPTON, Flushing, N. Y.

OF THE BOARD OF DIRECTION

(Abstract)

May 28th, 1912.—President Ockerson in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Bensel, Bush, Cain, Clarke, Endicott, Gerber, Kimball, Loomis, Ridgway, Staniford, and Thomson.

Ballots for membership were canvassed, resulting in the election of 8 Members, 31 Associate Members, 2 Associates, and 14 Juniors, and the transfer of 11 Juniors to the grade of Associate Member, and 2 Juniors to the grade of Associate.

Eleven Associate Members were transferred to the grade of Member. Applications were considered, and other routine business transacted. Adjourned.

June 26th, 1912.—The Board met at the Hotel Washington, Seattle, Wash., during the Annual Convention, as required by the Constitution; President Ockerson in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Cattell, Churchill, Kimball, Loomis, and Loweth.

No quorum being present, the Board adjourned.

July 9th, 1912.—A Special Meeting of the Board to canvass ballots for membership and to consider applications for membership was held at 4.25 P. M., Director Belknap in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Bush, Endicott, Ridgway, and Thomson.

Ballots for membership were canvassed resulting in the election of 9 Members, 36 Associate Members, 2 Associates, and 13 Juniors, and the transfer of 5 Juniors to the grade of Associate Member.

Nine Associate Members were transferred to the grade of Member.

Adjourned.

**REPORT IN FULL OF THE FIRST SESSION AND OF THE
BUSINESS MEETINGS OF THE FORTY-FOURTH
ANNUAL CONVENTION, SEATTLE, WASHINGTON.
ALL MEETINGS HELD AT THE HOTEL WASHINGTON.**

FIRST SESSION

Tuesday, June 25th, 1912, 9 A. M.—President John A. Ockerson in the chair; Chas. Warren Hunt, Secretary; and present, also, about 175 members and guests.

THE PRESIDENT.—The Society will please come to order. The Forty-Fourth Annual Convention of the American Society of Civil Engineers is now opened. I will ask Mr. S. H. Hedges to introduce the speakers to the Society.

S. H. HEDGES, M. AM. SOC. C. E.—I presume that all the visiting ladies and gentlemen have heard something about the "Seattle spirit." I have heard it defined in a dozen different ways, but I think it means something along the line of a little energy, a little ability, and, possibly, a little determination to do things. The local members of the American Society of Civil Engineers wanted the Society to come here for the Convention, and started out to get them to come here. With the aid of the membership all the way up and down the coast, the Society is now here for its Annual Convention. I think that we out here were possibly a little bit selfish in requesting the members from the East to come all this long distance to Seattle, and I think our selfishness was something along this line: We are all boosters for this Western country; a great many of us have come out here from the East, and as the saying goes, we are "stuck" on our new home. Now we tried to show you last night a little bit of the resources of this country and of Alaska. We had some photographs and a little talk on Alaska. It was stated at that time that Alaska had not been touched yet. That is one of our resources in the Northwest. Further than that, in this State we have manifold resources: in agricultural lines we raise fruit perhaps better than almost any other State in the Union. We are at the present time making cement about a hundred miles from here, and as good Portland cement is made there as anywhere in the world, with mills that aggregate 500 barrels a day. Possibly it is not well known, but there are all kinds of good ore to the south of us; we know that we have all kinds of good coal up in Alaska, and some day we are going to get them together, and at that time we will have some very, very large steel plants, rolling mills, and so forth. It has been estimated, I think, by the United States Government that there are 12 000 000 h.p. of water awaiting development which is now going to waste here every year. Now the people of this country realize that we have not got capital at the present time to

develop our resources. We want to see them developed. We know that you eminent gentlemen from the East represent the capital of the East, and that capital, after looking over our resources, will invest. For that reason we wanted you to see our resources.

On the other hand, in asking you to come here, we do not feel that we are entirely selfish, because we have as fine scenery in this western country as there is on earth. We have as fine a climate as there is on earth. Mr. Loweth, of the Milwaukee, in riding over this line, has said that you just start in to see the scenery when you get over the Rocky Mountains. I want to say to this Convention, what I have had said to me by people who have traveled all over the world, that there is no place on earth where you can see such scenery as may be seen from where we are now—at the top of the Washington Hotel. You can stand here on a clear day and see the Cascades on the east, and Lake Washington, an inland lake 26 miles long; to the west, the Olympics and Puget Sound; to the north, Mt. Baker, a peak about 14 000 ft. high, always snow-capped; and to the south Mt. Rainier, or, as our Tacoma friends call it, Mt. Tacoma, 14 500 ft. high. Where in the world can you see anything finer?

The Governor of our State, at the time we talked of having this Convention here, very kindly wrote a strong note urging the Society to come. He was scheduled to make an address of welcome for the great State of Washington, but has been unavoidably detained, and in his stead he has asked Mr. George A. Lee, Chairman of the Public Service Commission of this State, to address you in behalf of the State of Washington. I take pleasure in introducing Mr. George A. Lee.

GEORGE A. LEE, Esq.—Mr. President, Mr. Mayor, members of the American Society of Civil Engineers, and guests of the occasion: Governor Hay regrets his inability to be present to-day; previous engagements interfered, and he has asked me to represent him.

I assure you that it is a genuine pleasure to welcome this distinguished Society to the State of Washington. I believe that this is your Forty-fourth Annual Convention, and only once before have you honored the Pacific Coast with your presence. We welcome your Society to our State, and trust that your visit may prove profitable and pleasant. While busily engrossed in convention business, we trust that you will find time for recreation. Gentlemen, we take pride in saying that our mountains will challenge your admiration, our waters will afford you pleasant relief from the day's deliberations, and our parks and boulevards invite your presence; our matchless and unsurpassed scenery is yours to enjoy.

The work of this Society is fundamentally pioneer and constructive work. So, also, the citizenship of Washington has been engaged in pioneer and constructive work. In a few short years the mountains have been tunneled, transcontinental railroads have been constructed,

the great forces of Nature have been harnessed and utilized, giant forests have been converted into manufactured products, splendid industries have been developed, and from a rough and rugged wilderness has emerged a great cosmopolitan State, with cities that challenge the admiration of the world. We may be pardoned for a just pride in these accomplishments, and it affords me pleasure to say that members of the Engineering Profession have played no small part in these achievements. The dredging of our rivers and harbors, the vast re-grading projects of this metropolis, the construction of great railway systems, the development of electric utilities, and many kindred enterprises, all suggest engineering problems, and have required engineering knowledge and ability. The success with which these engineering questions have been solved in this city and State constitute, in my judgment, a high compliment to your Profession.

Gentlemen, you are convening to-day in a cultured and civilized community, in a State whose progress, prosperity, growth, and development, but typify the people who inhabit it. You are in a region of varied and boundless resources. You are in a truly typical and representative American State. As I have stated, the Engineering Profession has contributed much to this remarkable growth and development.

It will interest you to know that, prior to the organization of the American Society of Civil Engineers, an engineer, and the man who was to become Washington's first territorial Governor, was assigned to coast survey work in this territory. In 1849 Isaac I. Stevens chose George B. McClellan, and they at once commenced active work in exploring a route for a Pacific railroad. In 1852, the year in which this great Society was born, Stevens and McClellan were actively engaged in engineering this great project which was to mean so much to the Western Country. At this time Mr. Stevens was appointed by President Pierce as the first Governor of Washington Territory. In characteristic manner, Governor Stevens notified the people of the Territory that he was departing for his new post of duty, that he was to explore the route for a Pacific railroad while on the way, but that this would not delay the organization of a territorial government. Governor Stevens was brilliant and energetic, possessing engineering and executive ability of a high order and almost unlimited capacity for work. He entered on the preparation for his varied undertakings with the enthusiasm which distinguished him and his work in all his after years. In order to complete the railroad survey in a single season, he arranged to send a party to the Pacific Coast by way of Panama to begin work at the western end, while he himself, with another party, would begin at the Mississippi. The eastern party, under the inspiration of Governor Stevens' own activity, pushed rapidly westward, exploring a wide range of country across what is now Minnesota and the Dakotas. I will not detain you with an

historical account of the dangers, hardships, and toil incident to that pioneer survey.

Governor Stevens was a brilliant statesman and a sturdy, capable engineer. He paved the way for a substantial and permanent State, for great transcontinental roads, for the development of an unsurpassable empire. I mention this as interesting history. In the year in which this Society was born Governor Stevens was making possible, to a certain extent at least, the comforts and evidences of civilization which now surround and attract you. Industry, integrity, ability, energy, brilliancy—these and many other qualities he possessed. It must gratify you, therefore, to know that Washington's first eminent citizen and statesman was a capable, constructive engineer. His work stands as a perpetual inspiration to those of the Profession.

If time permitted and the occasion demanded, it would be interesting to recount some of the great engineering achievements of recent times. They are amazing in their conception and still more startling in their successful completion. Great forces of Nature have been subdued, and the topography of nations has been almost changed. A recitation of these accomplishments would be supererogation on my part, for many of the men intimately identified with such work are members of this Society and sit in this convention to-day. I will say, however, in passing, that the people appreciate your services in the elaboration and execution of these many projects. Beautiful and artistic bridges span our rivers, and make commerce and intercourse easy and pleasant; attractive park and boulevard systems, with harmony and unity of plan, attract and command our attention and elicit our admiration; great concrete and steel buildings tower to the sky as a monument to man's genius; public buildings that please the eye and excite the pride are constantly designed; canals, railroads, highways, reclamation and irrigation projects, are conceived and completed, giving new arteries of commerce to the world and making possible thousands of new homes and producing units. In view of these and varied other activities and successful achievements, truly it can be said that the Engineer, using that word in its broad signification, is a benefactor to society and the race. Your work is not only useful, but "a thing of beauty and a joy forever."

A learned member of this Society has recently said that the industrial and economic development of the past two decades has opened many new lines of special work in the Profession of Engineering, none of which is more difficult and complicated or of greater ultimate value to the public at large than that of the valuation of property owned and operated by public service corporations; and none of the fields of engineering specialization requires greater care or calls for more skill, experience, integrity, or sound judgment.

As a member of the Public Service Commission of the State, I

fully agree with the statement. The passage of public service commission laws and the regulation of public service corporations by the State has certainly opened a new, intricate, and yet fascinating field for the Engineering Profession. Our experience with the appraisal of public utility properties in this State warrants the assertion that a fair, just, thorough, honest, and accurate valuation depends largely, if not entirely, on the ability, industry, and integrity of the engineer. The determination of market value may perhaps be a matter of judgment and business knowledge; the questions of "going value," "franchise value," etc., may likewise be reasonably determined by members of commissions; but the questions of original plant cost, of reproductive cost, of depreciated value, of overhead charges, and scores of related and kindred problems are necessarily and fundamentally for engineering determination. You of the Profession, who are attracted by this important branch of work, have unequalled opportunities for service to the State, to the Nation, to yourselves, and to the calling which you have chosen.

I want to say at this time that the Public Service Commission of Washington most highly appreciates the faithful and loyal efforts, the splendid ability, and untiring energy of one of your Associate Members, Mr. Henry L. Gray, Chief Engineer of the Commission.

Gentlemen, your work is constructive. You are essentially builders. Idlers, theorists, visionary men, have no place in your ranks. To engineers an undertaking or project means what the expression implies—to prepare it, to supervise it, to bring it to a successful consummation. In this day and age the engineer cannot be provincial. He cannot live or operate in a limited zone. He must be a student of finance, of economics, of politics, of business. He must have a trained, accurate, analytical mind. He must be of unquestioned integrity—inspiring the confidence of all. The requirements of your profession are high, as in the legal profession; but, gentlemen, the goal is worthy of your best efforts. The work of great jurists, legislators, and statesmen is their everlasting and enduring monument. So, also, the permanent and constructive work of the engineer is his best reward.

This Society, now sixty years old, is for the advancement of engineering knowledge and practice, for the maintenance of a high professional standard among its members. Washington is glad, indeed, to welcome such a society to her borders. You stand for engineering proficiency, for integrity, for constructive achievement, for good citizenship. In behalf of this great State of the Northwest, and its Governor, I welcome you, and assure you that we will profit by your presence. We trust the memories of this occasion will linger long, and that the Society may again honor us with its presence. May the characteristic Seattle hospitality thoroughly possess you, and may your

deliberations be attended with pleasure, profit, and a wholesome recreation on the shores of Puget Sound.

MR. HEDGES.—Ladies and Gentlemen, I now have the pleasure of introducing to you the Mayor of Seattle, who is an engineer of prominence in the Northwest. He has not as yet affiliated himself with the American Society of Civil Engineers, but I hope he will soon, I take pleasure in introducing the Hon. George F. Cotterill.

HON. GEORGE F. COTTERILL.—Mr. President, Ladies and Gentlemen, Fellow-Members of the Engineering Profession: I certainly feel that it is more than a usual privilege which comes to the Mayor to stand and welcome guests of our city, when given this opportunity to stand before a representative society of my own profession in this country, and give you welcome to the city which has been my home and the scene of my efforts for more than a quarter of a century.

It is characteristic of our friend, Mr. Hedges, that when he invites some of us to make a talk about our city, to make all the speech himself in opening. If there was anything he did not say it was certainly well and beautifully said by the representative of our good Governor of the State of Washington; but there are a few facts that, at least, I would be glad to impress for a few moments this morning, which may amplify, if it needs amplification, the welcome which you know has been yours from the time you came to this city, and will continue until you leave, and will remain, for that matter—an invitation for you to return.

I think it may be said that this City of Seattle and the vicinity about us in this State of Washington, represent perhaps more than any other State or than any other section of our country, the results of the labors of the Engineering Profession. In the twenty-eight years that I have been permitted to live in this city, I have seen it expand, numerically speaking, from a population of 7 000 to practically forty times that number; to see it expand, geographically speaking, from a little clearing of perhaps 1 000 acres in the primeval forest near the central point of our harbor until now it covers and includes within its city limits 58 sq. miles of land area, and suburban sections that stretch above and far beyond these limitations. I shall always feel that it has been a great privilege and a most fascinating part of my life to have seen this portion of our earth's surface, during these twenty-eight years, prepared for the uses of man, for the development of a great city; to be some small part of the creative processes which have fashioned, and adapted, and overcome the obstacles of Nature, in order to make possible such a city as this.

Just by way of sharp contrast, for instance—if it has not already been called to your attention in the individual conversations which I am sure have probably suggested this point—let me just say that here, within 100 ft. of the spot where I now stand, on the fourteenth story

of this hotel, eight years ago was the corner of a great hotel structure something like 100 by 200 ft. in its ground area, eight stories high, representing a half million or six hundred thousand dollars in expenditure, and standing on a site as high as the eighth story of this building. That building was demolished and the hill on which it stood was taken down in order to make possible the improvements which you have seen about you. Within three blocks of this spot that same hill towered to a height that is higher than this fourteenth story. This gives just a suggestion of that which has been done in preparation for the expansion of this city.

If you look to the southward you may see the outlines, at least, of 1 500 or 2 000 acres that have been reclaimed from useless tide flats and are being made the scene of industrial and commercial operations, with much of present activity, and more of future promise. If you were to trace along even our central water-front, you would find how this city has grown fully three blocks to the westward from the original shore line, even into depths of 100 ft. of water, and reclaimed the land that was needed below the steep bluff which hampered its progress, in order to give something approaching a level for the extension of the city.

So I might go on and picture other phases of this marvelous development of which the engineers have been the guides, the pathfinders, the designers. Some may say, of course, that mistakes have been made, mistakes for lack of resources, mistakes perhaps for lack of foresight. It is peculiar, of course, with the various professions, that the Engineering Profession may be somewhat unfortunate with reference to its mistakes, when we consider it in contrast with others. Of course, the ministerial profession, the highest in the professional line, makes no mistakes. The legal profession is always able to explain away its mistakes. The medical profession buries its mistakes; but the mistakes of the Engineering Profession stand out for all the world to see and mark. (Applause and laughter.)

Be that as it may, the engineers of this vicinity and of this city have tried to do their part in making a way for a great city. I want to take occasion—even though it may seem to show just a little of the boasting spirit which my friend, Mr. Hedges, so well exemplifies—to remind you that it is no idle statement when we say to you that we believe we have here in Seattle the greatest opportunity, present and future, for a great commercial city, that there is on earth, in the midst of such beautiful surroundings of Nature. It has been permitted to me to travel somewhat over this earth of ours, and I say to you, with all due modesty of expression and all excess of local patriotism, that there is no spot on earth where there is opened so much of commercial opportunity with so much of scenic beauty, climatic con-

venience, and opportunity for the fullest, best, and highest development of humanity.

If you can imagine for a moment a great picture, one hundred miles square, going fifty or sixty miles to the eastward, to the westward, to north and to south from this spot, I undertake to say to you that that square would include within its borders as much of scenic beauty as there is in any similar area, on the American Continent, at least; and there are those who say with proper patriotism that in America we have scenic beauties that excel any of this world. Just think of it for a moment! The great Cascade Mountains, 8 000 ft. high, as the eastern border of such a picture, with those two great snow-capped mountain sentinels, Baker and Rainier, at the corners. Then to the westward this silhouette of the Olympics against the sunset sky, the like of which no artist has ever drawn. Between these mountain barriers—the borders of such a picture—this intricate convolution of Puget Sound with its 1 500 or 2 000 miles of shore line, with its harbors, its points, its peninsulas, its islands, and its forests, and from this the rolling foot-hills backward to the mountains. Then in such a scene as this place these cities. Our own City of Seattle, with its population of 250 000 or 300 000, Tacoma, to the southward with another 100 000, and to the northward Everett and Bellingham and other good cities, emphasizing the commercial opportunity and human development in such surroundings as these. Then think—I dare not amplify the matter—think of this spot in the very path of world commerce; a place where five transcontinental railways of our country—three coming directly across the Cascade barrier and the others from the south, from the Columbia River—here meet this great arm of the ocean, Puget Sound and the Strait of Juan de Fuca, with their entry to the greatest of all oceans. With the Panama Canal soon to be accomplished, these will give direct connection to all the oceans. We believe—and we think that we have a right to believe—that here, not only have great things been done, but that here is the spot where there will be much of material achievement and of commercial development; and with it all we hope and are trying to be assured that there shall be as much of idealism and humanitarianism as has ever characterized any place, in any country, in any time.

It is to such a city, such a vicinity, such a State, with such opportunities, with such scenery, with such surroundings, that we welcome you to-day. I am sure that—although the engineer deals in practical things and in material accomplishments, because the engineer is an idealist—the Convention can see what can come from such surroundings as these. It is that vision, that idealism, that makes the true engineer, and we want you, who have come from other portions of our country, to catch this vision, to share this idealism; and we know that you, being men of great achievements in other portions of

the country, cannot in the nature of things make your home with us, but wherever you may be—whether it be, as our worthy President, in conquering rivers of our own or in other continents, or whether it be in directing the destinies of the great railways of our own land, or whatever may be your tasks in the other great cities of our country—we feel assured that you will all retain a pleasant memory. You will think more of our country and more of our profession by reason of what you have seen and heard and experienced from the welcome which is yours, sir, and yours, ladies and gentlemen, from the heart of this city of ours. I thank you. (Great applause.)

MR. HEDGES.—Ladies and Gentlemen, I intimated to you a few minutes ago that the engineer and banker went hand in hand. Years ago it was not that way, but now it is. The banker and the engineer go hand in hand. In the early time when the average individual came to Seattle he did not have much of a bank account. We had some bankers here in the city who went farther than the average banker in the East. The banker here gave the average individual coming here a credit on faith. In other words, he looked up the reputation of the individual and his ability to do things. If his reputation and ability were good, he gave him credit to do things when he didn't have money. In other words, the bankers of this city very largely financed all the local enterprises, and are financing these enterprises now. Therefore I am going to introduce to you Mr. J. W. Spangler, the Secretary of the Clearing House Association.

J. W. SPANGLER, Esq.—Mr. Hedges, Mr. President, Ladies and Gentlemen: After the extravagance and eloquence of the previous speakers there is little left for a mere banker to say. My appearance on this programme, coincident with Mr. Lee, representing the State, and his Honor, Mayor Cotterill, seems superfluous, and I am reminded of a conversation which was overheard between three oysters. "Where are we?" inquired one oyster. "We are in the soup," was the reply. "Yes, I know we are in the soup, but where." "Well, we are in the soup at a church supper." "Well, what in the world do they want of all three of us." (Applause and laughter.)

In extending a welcome to this distinguished society on behalf of the Associated Bankers of Seattle, I find myself confronted with a pleasing task, but at the same time at a slight disadvantage, for to welcome you to our vaults would seem vulgar to consider. Now, in the interests of refinement, therefore, I shall refrain from extending your welcome to our cash resources, excepting, of course, upon your lodging approved collateral. (Laughter.)

It is entirely proper, however, I believe, for me to assure you that your letters of credit, within their stated limitations, upon your satisfactory identification, will be met with due honor by any local bank to which they may be addressed. (Laughter.)

That we hold your Society in high esteem is indicated by the fact that we have elected the distinguished speaker who preceded me, a member of your profession, to the very responsible and high office of Mayor of this city. In receiving you with hospitality, ladies and gentlemen, we are obeying the injunction given as early as the time of the Apostles, for in Hebrews XIII, 2, we read, "Be not forgetful to entertain strangers"; and, from the same high authority we learn that "The reward of hospitality is frequently abundant." You will recall that Abraham received strangers who came to him and thereby entertained angels unawares. Laban's hospitality was rewarded by his finding for himself a valuable servant and a good husband for his daughter. (Laughter.) It occurs to us that the simile is perfect. The banker's profession and that of your great profession may not seem to be very intimately related, but I would remind you that eventually in their transactions they do become very intimately related, and in the end the banker finds no professional opinion to which he attaches greater importance than the opinion of a first-class engineer. When we come to the point of determining whether or not we will risk the funds which are intrusted to us upon a given proposition, there is no last word which we find more valuable than your own. So high is the standing of this profession that I cannot say any less than to express the hope that the standing of my own profession may never fall below your standards. The wisdom and the nature of your profession has found much opportunity, and I believe in the future will find even greater opportunity in this far western country which Providence has so kindly blessed with natural resources, the development of which is well-nigh impossible without your aid.

We sincerely hope that this Convention will redound to the distinct advantage of your Society, and to you individually, and that you will have an abundantly pleasant time personally. I thank you. (Applause.)

MR. HEDGES.—It has given me great pleasure to welcome the American Society of Engineers to our city. It has given me pleasure to introduce Mr. Lee, as a representative of our Government; also to introduce to you Mr. Cotterill, as Mayor of our city; and Mr. Spangler as a representative of the banks of our city, but it is a still greater pleasure at this time to introduce to you the President of the American Society of Engineers, a man of not only National but of International reputation.

(The President, John A. Ockerson, then delivered the annual address.*)

Adjourned.

* See page 909 of Papers and Discussions.

THIRD SESSION, BUSINESS MEETING. REPORT IN FULL.

Wednesday, June 26th, 1912, 9 A. M.—The meeting was called to order; President John A. Ockerson in the chair; Chas. Warren Hunt, Secretary; and present, also, about 100 members.

THE PRESIDENT.—The first business on the programme is the Secretary's report on the suggestions received as to the time and place for holding the Forty-fifth Annual Convention.

Secretary's Report as to the Suggestions Received for the Time and Place for Holding the Forty-fifth Annual Convention in 1913.

I beg leave to report a canvass of the suggestions received from members of the Society as to the Time and Place for holding the Annual Convention of 1913 as follows:

Nashville, Tenn.....	74	Pittsburgh, Pa.....	11
Boston, Mass.....	40	New York City.....	10
Saratoga, N. Y.....	30	Atlantic City, N. J.....	9
Havana, Cuba.....	22	St. Louis, Mo.....	9
Baltimore, Md.....	18	Panama.....	8
Chicago, Ill.....	18	Kansas City, Mo.....	7
New Orleans, La.....	17	Denver, Colo.....	6
Los Angeles, Cal.....	14	Niagara Falls, N. Y.....	6
Washington, D. C.....	14	San Francisco, Cal.....	5
Detroit, Mich.....	11		

"The following have received 4 votes each: Atlanta, Ga., Birmingham, Ala., Buffalo, N. Y., Cleveland, Ohio, Montreal, Que., Canada, New London, Conn., and St. Paul, Minn.

"The following have received 3 votes each: Ottawa, Ont., Canada, Philadelphia, Pa., Rochester, N. Y., and Yellowstone National Park.

"The following have received 2 votes each: Cape May, N. J., Cincinnati, Ohio, Duluth, Minn., Jacksonville, Fla., Key West, Fla., London, England, Mackinac Island, Mich., Memphis, Tenn., Minneapolis, Minn., Eastern Point, New London, Conn., Oklahoma City, Okla., Poland Springs, Me., Quebec, Canada, Salt Lake City, Utah, and Syracuse, N. Y.

"The following have each received one vote: Alaska, Asheville, N. C., Butte, Mont., Cambridge Springs, Pa., Chattanooga, Tenn., El Paso, Tex., Fresno, Cal., Galveston, Tex., Jefferson, N. H., Lake George, Livingston, Mont., Louisville, Ky., Manchester, Vt., Montgomery, Ala., Norfolk, Va., Old Point Comfort, Va., Omaha, Nebr., Portland, Me., Rockland, Me., St. Augustine, Fla., Thousand Islands, Toronto, Ont., Canada, Minneapolis or St. Paul, Minn., Steamer Trip on Great Lakes, Some place in District No. 6, and Some city along the line of the "New Erie Canal," say Syracuse, N. Y.

"The total number of suggestions received is 425.

"As to the Time for holding the Convention, the following 392 suggestions have been received:

January has.....	3 votes.	tion of Havana as the	
February	2 "	place.)	
March	4 "	January or February....	1 vote.
April	6 "	February or March.....	1 "
May	36 "	April or May.....	1 "
May 20-31.....	73 "	April or October.....	1 "
(This suggestion was		May 10 to June 10.....	1 "
printed on postal cards		May or June.....	1 "
suggesting Nashville as		June or September....	1 "
the place.)		June or July.....	6 votes.
June has	183 "	July or August.....	3 "
July	24 "	September or October...	1 vote.
August	8 "	Non-rainy season.....	1 "
September	9 "	(This suggestion in con-	
October	8 "	nection with Panama	
December	2 "	Canal Zone.)	
Early in January or		Early summer	2 votes.
March	11 "	Winter season	1 vote.
(These votes came in		Fall	1 "
connection with sugges-		Usual time.....	1 "

"Since the above count was made, there have been a number of other suggestions received, almost all of them on printed postal cards. This printed postal card suggests Nashville, Tenn., and revokes any previous expression that has been made.

"There was not time to investigate to see how many of those who thus voted had voted before, and this additional count is simply given for the information of the members:

Nashville	345	Los Angeles, Cal.....	1
Havana	3	Norfolk, Va.....	1
Detroit	2	Panama	1
Baltimore, Md.....	1	Pittsburgh, Pa.....	1
Chicago, Ill.....	1		

"The Secretary has also received communications as follows:

"NEW LONDON, CONN.—From the Mayor of the City, and from the President of the Business Men's Association.

"HAVANA, CUBA.—Letters from J. F. Case, M. Am. Soc. C. E., and James Nisbet Hazlehurst, M. Am. Soc. C. E., in favor of holding the Convention in Havana, and enclosing letters of invitation from the Mayor of Havana and from the Provincial Governor.

"OTTAWA, ONT., CANADA.—From T. C. Keefer, M. Am. Soc. C. E., Sir Sanford Fleming, M. Am. Soc. C. E., and C. R. Coutlee, M. Am. Soc. C. E., about Ottawa.

"PEORIA, ILL.—Letter from the Secretary of the Peoria Association of Commerce setting forth his idea as to where the Society should hold its next Convention.

"BALTIMORE, MD.—Letter from Engineers' Club of Baltimore."

THE PRESIDENT.—What is the pleasure of the members?

H. B. SEAMAN, M. AM. SOC. C. E.—I move that the matter be referred to the Board of Direction, with power to act.

B. L. CROSBY, M. AM. SOC. C. E.—I second the motion.

(Whereupon the motion was put to vote and carried unanimously.)

THE PRESIDENT.—The next business on the programme is the report from the Board of Direction relating to a resolution which was referred to the Board by the Annual Meeting of January 17th, 1912, with reference to the appointment of a Special Committee to report on the general condition of Civil Engineers throughout the country.

THE SECRETARY.—At the Annual Meeting of January 17th, 1912, the following motion was submitted by letter from Percival M. Churchill, Assoc. M. Am. Soc. C. E., and was referred to the Board of Direction:

"That the President appoint a Committee of eight members to look into the conditions of employment of Civil Engineers throughout the country, the compensation they receive, the duration of employment, the expenses for which they are reimbursed by the employer, the expenses due to the work paid by the engineers themselves, the net yearly income, the prices charged for different classes of private work, and any other facts necessary to clearly set forth the problem. The report to set forth recommendations for action by the Society looking toward improving existing conditions and to include a report on the feasibility of this Society operating an employment bureau for its members covering all classes of engineering work. The Committee to consist of four employing engineers and four engineers holding subordinate positions. The Committee to be authorized to add to its membership and to fill vacancies. A preliminary report to be rendered in six months."

The Board has instructed the Secretary to present the following to this Business Meeting:

"The Board of Direction has carefully considered the above motion, and begs leave to report as follows:

"(1) That it does not feel that it would be practicable or wise for the Society to operate an employment bureau for its members.

"(2) That it feels that it would be of valuable interest to the Society to know the conditions of employment and the compensation of Civil Engineers throughout the country.

"(3) That it therefore recommends to the Business Meeting of the Convention that the matter be referred back to the Board with instructions to appoint a Committee to investigate the conditions of the employment of, and the compensation of, Civil Engineers throughout the country; to collect statistics and data in regard thereto, and to report the results of such investigation to the Society."

THE PRESIDENT.—What is the pleasure of the Society in regard to the recommendations of the Board?

S. H. HEDGES, M. AM. SOC. C. E.—I move that the recommendations of the Board be adopted.

MR. CROSBY.—I second the motion.

(Whereupon the motion was put to vote and carried unanimously.)

THE PRESIDENT.—The next matter on the programme is a letter from Mr. Charles Kirby Fox, Assoc. M. Am. Soc. C. E., suggesting a Special Committee on Irrigation Affairs.

THE SECRETARY.—Mr. Fox's letter is just received:

"FORT BIDWELL, CAL.,
"JUNE 20, 1912.

"MR. CHAS. WARREN HUNT, *Secy.*,

"Care, Hotel Washington, Seattle, Wash.

"DEAR SIR:—

"I would suggest the forming of a Special Committee on Irrigation Affairs by the American Society of Civil Engineers.

"I would suggest that the duties of this committee would be to investigate the present status of irrigation and peculiarly on the amount of arable land under projects now completed or almost completed which has not been brought under cultivation.

"There have been several estimates published, official or otherwise, showing the amount of unused land under the present projects is sufficient to last several years without further construction work being done. From what I have seen it is my impression that it is the usual custom to take the gross acreage under the ditches and from this take the present cultivated area leaving the balance as the present uncultivated area available for irrigation. This does not take into account the poor lands which at present are valueless.

"I believe if these poor lands were taken out of the estimates, that they would show that we have not more than a reasonable working balance of arable land under the ditch systems at present.

"Respectfully yours,

"CHAS. KIRBY FOX."

THE SECRETARY.—This letter is brought to the attention of the Business Meeting because Mr. Fox suggests the forming of a Special Committee on Irrigation Affairs.

THE PRESIDENT.—As I understand it, this letter has not had any consideration from the Board?

THE SECRETARY.—No, Sir.

THE PRESIDENT.—So that the proper disposition would be to refer the matter to the Board for consideration.

MR. CROSBY.—I move that the matter be referred to the Board of Direction for consideration.

W. A. CATTELL, M. AM. SOC. C. E.—Mr. President, I second the motion.

(Whereupon the motion was put, and carried unanimously.)

THE PRESIDENT.—The next matter on the programme is the proposed Amendment to the Constitution.

THE SECRETARY.—The following amendment to the Constitution has been presented to the Secretary, has been sent by letter to each Corporate Member, as prescribed in the Constitution, and now comes before this Business Meeting in regular course.

“Strike out Article VII and substitute the following:

“ARTICLE VII.—NOMINATION AND ELECTION OF OFFICERS.

“1.—The Board of Direction shall, from time to time, divide the territory occupied by the membership into seven geographical districts, to be designated by numbers. District No. 1 shall be the territory within fifty miles of the Post Office in the City of New York. Each of the other districts shall be, as nearly as practicable, contiguous territory on State or Territorial lines; each shall contain, as nearly as practicable, an equal number of members, and they shall be designated as Districts Nos. 2, 3, 4, 5, 6, and 7. The Board shall announce such division to the Society on or before the first day of March in each year.

“2.—At the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts, shall be appointed by the meeting to serve for two years; who, with the five living last Past-Presidents of the Society, shall be a committee to nominate officers for the Society.

“The Board of Direction may prescribe the mode of procedure for appointing this committee, and fill any vacancies occurring.

“This committee shall meet at the Annual Convention of the Society, except when said Convention is not convened before the fifteenth day of July or is convened outside of the United States, in either of which events it shall meet at a time and place to be designated by its Chairman by written notice to each member not less than two weeks in advance, which time shall not be later than the fifteenth day of July, and shall select nominees to fill the offices named in Article V, with the exception of the office of Secretary, so as to provide, with the officers holding over, a Vice-President and six Directors residing in District No. 1, and twelve Directors divided equally, with regard to number and residence, among the remaining districts, Nos. 2, 3, 4, 5, 6, and 7. At this meeting this committee shall elect from among its members a Chairman and a Secretary to serve for one year beginning on the first day of the following September. At all meetings of the committee ten members shall constitute a quorum. Nominations under this section shall be designated as ‘Official Nominations.’

“A list of the nominees selected for the offices to be filled at the next Annual Election shall be presented by this committee to the Board of Direction not later than the first day of August, and the Secretary shall thereupon immediately notify each nominee of his nomination and ascertain his acceptance or declination.

“If at any stated or called meeting of the committee there shall not be a quorum present, then such members as are present shall call an adjourned meeting for the transaction of the Committee’s business.

“3.—Directly after the first day of October the aforesaid list of nominees shall be mailed to every Corporate Member whose address is known, provided that if any person shall be found by the Board of

Direction to be ineligible for the office for which he is nominated, or should a nominee decline such nomination, his name shall not be sent out, but the Board shall substitute another name therefor, and further provided that in the event that the Nominating Committee fails to select a nominee for any office as above stipulated, the Board shall select a nominee therefor. The Board shall also fill any vacancies that may occur in this list of nominees up to the time the ballots are sent out. Vacancies shall be so filled as to preserve the geographical distribution of officers prescribed in Section 2 of this Article.

"4.—Additional nominations complying with Section 2 of this Article regarding the distribution of nominees among the several districts may be made by declaration, provided such declaration is accompanied by an acceptance of the nomination signed by the nominee, and is filed with the Secretary before the first day of December, and further provided that each declaration shall be signed by at least twenty-five Corporate Members. Nominations made in accordance with this Section shall be known as 'Nominations by Declaration.'

"5.—At least thirty days before the Annual Meeting, there shall be mailed to every Corporate Member whose address is known a letter-ballot with envelopes for voting. This ballot shall include the names and residences of all persons nominated in accordance with this Article, their grades of membership, and, in the case of nominees for Directors, the number of the district in which they reside. Under the names of the nominees for each office so printed there shall be provided a space for the use of the voter if he desires to substitute another name. Nominations by Declaration shall be distinguished from Official Nominations by some convenient mark or words. There shall also be printed on the ballot the names of the Nominating Committee as created by Section 2 of this Article, with the numbers of the districts which the appointed members represent, and also in a separate list thereon the names and residences of the signers of each Nomination by Declaration.

"Voters may strike out the name of any nominee printed on the ballot for whom they do not wish to vote, and may substitute therefor, in writing or by paster, the name of any person eligible for the office. The number of names for each office on the ballot voted shall not exceed the number to be elected to such office, and the vote must be for the proper number of officers resident in each of the seven districts. Ballots not complying with these provisions shall be rejected.

"Directions in accordance with these provisions shall be issued with the ballots.

"6.—Ballots may be sent by mail to the Secretary, or may be presented to him at the Society House. They should be enclosed in two sealed envelopes, and the outer envelope shall be endorsed by the voter's signature.

"The Secretary shall make a list of the voters from whom ballots are received, which list shall be open to inspection by all Corporate Members. A voter may withdraw his ballot, and may substitute another, at any time before the polls close.

"7.—The polls shall be closed at 9 A. M. on the first day of the Annual Meeting, and the ballots shall be canvassed publicly by tellers, who shall be appointed by the presiding officer.

"The persons who receive the largest number of votes for each office to be filled shall be declared elected.

"In case of a tie between two or more persons for the same office, the Annual Meeting shall elect the officer from among the persons so tied.

"The presiding officer shall announce to the meeting the names of the officers elected in accordance with this Section."

"This amendment was signed by S. L. F. Deyo, R. Montfort, Alfred Noble, Arthur S. Tuttle, and Emil Kuichling."

THE SECRETARY.—Mr. President, I have two letters in connection with this. I had two letters but I don't find them. I think I can tell what was in them. They were from E. T. Thurston, Jr., M. Am. Soc. C. E., who is Secretary of the San Francisco Association of Members, and from James Burden, M. Am. Soc. C. E., of Albany, N. Y. Mr. Thurston's suggested modification of this amendment covers the same ground as one of the suggestions of Mr. Burden, and seems to be a simpler way of handling it. He refers to the fact that in this proposed amendment a vote might be thrown out unless it contained a vote for each of the officers on the ballot.

Mr. Thurston proposes the following amendment to the proposed amendment:

"Strike out all of paragraph two of Section V, and substitute the following: 'Voters may strike out the name of any nominee printed on the ballot for whom they do not wish to vote, and may substitute therefor, in writing or by paster, the name of any person eligible for the office; but the number of names voted for any office shall not exceed the number of persons to be elected to such office. Ballots not complying with these provisions shall be rejected.'"

This will allow a man to vote for the Directors in his district and strike out everybody else if he does not want to vote for any of the others, and still have his ballot counted. As it reads in the original amendment, his entire vote would be thrown out if he did not vote for all the officers for which there are candidates.

I would like, in behalf of Mr. Thurston, to propose that change.

THE PRESIDENT.—What is the necessity of substituting any name by paster?

THE SECRETARY.—Well, that is the way it is prepared. That was carefully thrashed out by the committee. I offer that resolution to amend this amendment as suggested by Mr. Thurston.

MR. CROSBY.—I would suggest that this matter should not come before the meeting until a motion has been made to adopt the amendment.

THE PRESIDENT.—I was going to say that the amendment as presented here is now before you for such amendment as you may see fit

to make, and as amended at this meeting it will go before the members for ballot.

MR. SEAMAN.—I think that, before we enter upon the consideration of this general amendment in detail, we should have a synopsis of what the amendment accomplishes, as differing from present conditions. There are many of us who have been so absorbed, or who have not been in sufficiently close touch with conditions, that we cannot follow the changes which are proposed by this amendment, and I think that, before passing upon it either in general or in detail, we should have presented a synopsis of those changes. Perhaps some one present is more familiar with the amendment and can do that off hand, although, of course, it would have been better to have it formally prepared.

THE PRESIDENT.—I think the Secretary can give us that.

MR. HEDGES.—In order to get this matter officially before the meeting, I move the adoption of the change proposed in Mr. Thurston's letter.

THE SECRETARY.—May I say a word as to the Constitution of the Society. Amendments presented in the manner in which this amendment was presented must be sent out to all Corporate Members at a certain time before the next general meeting. They automatically come before that meeting for consideration. This meeting has no power whatever except to amend this amendment in a manner pertinent to the original amendment. If it so amends this amendment, the amendment, as amended, goes to letter-ballot of all the members of the Society. If it does not so amend, it cannot prevent this amendment going to all members, so that without any action of this body, this amendment comes before this Business Meeting simply for amendment in a manner pertinent to the original amendment.

C. H. SWEETSER, M. AM. SOC. C. E.—I move, then, that it be the sense of this meeting that this constitutional amendment be amended as suggested by Mr. Thurston.

THE PRESIDENT.—I think it would be well for the Secretary to explain the reasons for the changes that are suggested. He can do that in a few words, and probably that will enable the members to judge as to what shall be done with it.

THE SECRETARY.—In the first and second paragraphs there are practically no changes. The Geographical Districts and the appointment of members is the same. The third paragraph is exactly the same as it is now. The idea is the same. The present Constitution provides that the Nominating Committee shall meet at the Annual Convention. It does not provide when there shall be a quorum. As a matter of fact, if there were but one member of the Nominating Committee at the Convention he could nominate, and it would be legal and official. The present Constitution also provides that within

ten days after the meeting of the Nominating Committee at the Convention, a list of the nominees shall be presented to the Board of Direction. This amendment provides that the committee shall meet at the Annual Convention except when that Convention is convened later than the fifteenth of July, or is convened outside of the United States, in either of which events, as stated here, the time and place shall be designated by the Chairman of the Committee by written notice to each member, not less than two weeks in advance; but that time shall never be later than the fifteenth of July. The reason for that is to allow time enough, after the receipt of the list of nominees, for correspondence with them to secure their acceptance of the nomination, and for review by the Board. That is to say, the Board is the only authority constituted so that it can determine the eligibility of those particular persons. This is to cover the possibility that the Committee might nominate some one who is not eligible. I have known men to be nominated for high office in this Society who have not paid their dues. Of course, that is easily arranged, but there might be a more serious case of ineligibility, and the Board must consider this. Besides that, the Board is empowered to fill vacancies caused by death or otherwise. Provision is therefore made that this committee meeting shall be held early enough to enable the report of the action of the Committee to be in the hands of the Secretary in time to communicate with the nominees and report the matter later to the Board of Direction at its September meeting.

There is no change in the question of representation, either in District No. 1 or the other districts. The latter part of this paragraph provides for the organization of this committee, which is not provided for in the present Constitution at all. It also provides that a majority of the committee—there are nineteen on this committee—that ten members shall constitute a quorum. Further than that, it provides that the nominees of the Nominating Committee shall be described as Official Nominees. I think the next paragraph is covered by what I have said.

There is nothing in the next paragraph that differs at all widely from the present Constitution except the statement that the Board shall select a nominee for any office for which the Nominating Committee does not present a candidate, which, of course, would mean that, if the Nominating Committee fails to make any report, the Board of Direction would have to nominate.

Section 4 provides for the nomination of an opposition ticket; either for one or for more offices. The present Constitution, I believe, requires only the signature of ten members for an opposition nomination, and the Constitution is so worded that the name of that candidate must be placed on the ballot list without distinguishing marks of any kind. The present Constitution provides all kinds of

ways of taking care of the nominations presented by the Nominating Committee, but when it comes to opposition candidates, the Constitution provides that their names must be placed on the ballot list. There is no way out of it. Even if they decline the nomination, under the Constitution their names go on. This amendment is designed to take care of that. In the first place, that twenty-five Corporate Members must sign any additional nomination; secondly, that the nomination shall be accompanied by an acceptance from the nominee of the opposition. Section 5 is practically the same as at present, except that the provision is made that on the ballot there shall be a clear statement of those who are nominated by the Nominating Committee and those who are nominated by any opposition, and that the names of the Nominating Committee and the districts which they represent, and also the names of all those who sign opposition nominations, shall be printed with the ballot, so that the members shall have full knowledge of exactly how every candidate on the list came to be nominated and by whom he was nominated.

The next change is in Section 7. That is the closing of the polls at nine o'clock A. M. All the rest is practically the same as it is now. The present Constitution provides that the polls shall close at twelve o'clock noon on the day of the Annual Meeting, and that has caused considerable difficulty in the past at times, although we get over it by beginning the count before the polls close, and that is rather unfortunate because a man might want to come in and change his ballot, and we cannot tell whether he has voted or not. It is arranged to do this so that the tellers can get to work as soon as the Annual Meeting convenes, and a report can be made before the meeting is adjourned.

I don't know of anything further.

MR. SWEETSER.—If I understand it correctly, this proposed amendment simply makes the old amendment more definite, as to time and such things as that, and I renew my former motion that it be the sense of this meeting that this amendment, as amended by Mr. Thurston, be presented to the Society.

MR. CATTELL.—I second that motion.

THE SECRETARY.—There are one or two other things. I think there are probably some other amendments that some gentlemen have.

E. E. WALL, M. AM. SOC. C. E.—I have an amendment to this proposed amendment of the Constitution, which I wish to submit to this meeting, but, before I read it, I want to say that this amendment that I have in my hand was prepared by the Nominating Committee. All the members of the committee, at least those who are present at this Convention, have agreed unanimously on the changes that we suggest in this paper. All the members who are present here, with the exception of one, have served on the Nominating Committee during the

last year, and we feel that our experience on that committee entitles us to criticize the amendment as originally proposed and to change some points that we think should be changed.

With your indulgence, I will read our proposed amendment to the printed copy which all the members have.

"From proposed Amendment to the Constitution, as printed April 23d, 1912, strike out Article VII, Section 2, and substitute the following:

"2.—At the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts, shall be appointed by the meeting to serve for two years; who, with the seven members holding over and the five living last Past-Presidents of the Society, shall be a committee to nominate officers for the Society.

"The Board of Direction may prescribe the mode of procedure for appointing this committee, and fill any vacancies occurring.

"This committee shall meet at the Annual Convention of the Society, or at a time and place to be agreed upon by a majority of its members, but said meeting shall not be later than the fifteenth day of July. At this meeting this committee shall elect from among its members a Chairman and a Secretary to serve for one year beginning on the first day of the following September. At all meetings of the committee eight members shall constitute a quorum. If at any stated or called meeting of the committee there shall not be a quorum present, then such members as are present shall call an adjourned meeting for the transaction of the committee's business. This committee shall select nominees to fill the offices named in Article V, with the exception of the office of Secretary, so as to provide, with the officers holding over, a Vice-President and six Directors residing in District No. 1, and twelve Directors divided equally, with regard to number and residence, among the remaining districts, Nos. 2, 3, 4, 5, 6, and 7. In case any nominee or officer shall change his residence from one district to another he shall continue until the election or the expiration of his term of office to represent the district in which he resided when nominated. Nominations under this section shall be designated as 'Official Nominations.'

"A list of the nominees selected for the offices to be filled at the next Annual Election shall be presented by this committee to the Board of Direction not later than the first day of August, and the Secretary shall thereupon immediately notify each nominee of his nomination and ascertain his acceptance or declination."

Now the changes in this printed copy that we propose are in the first paragraph of Section 2. We interpolated the words "seven members holding over and the," because it is only by implication from the wording of the original amendment that you would know that there are any other members of the Nominating Committee save the seven and the five living Past-Presidents.

The second change that we have is in the third paragraph about the meeting of the Nominating Committee. Now, it has been difficult

to get a majority of the members of the Nominating Committee at the Annual Convention, and in a number of cases a small part of the committee have been present to make nominations. I am told that in one case there were only three members of the Nominating Committee who made out the tickets. We think it should be made easier for the members of the Nominating Committee to get together. Let them select their own place and time, with the restrictions of the dates for meeting, and then, not at the call of the chairman, but at a time and place agreed on by a majority of the members, which can be arranged by correspondence, and then you can get a quorum together. Under this amendment, as it stands printed, you are not any more likely to get a majority of the committee—that is, ten members to constitute a quorum, which is a majority—you are not any more likely to get them under this proposed amendment than you are now. At this Convention here in Seattle there are only five members present out of the nineteen. Now, if the committee can be allowed to select its own time and place, they can arrange and be sure of a quorum. I believe those are the principal changes that we make, except that, instead of ten members for a quorum, we ask that it be made eight, on this ground, that there are fourteen elected members on the Nominating Committee. Eight will represent a majority of the elected members. Five living past-presidents, *ex-officio* members of the committee—that they, with the eight, should constitute a quorum of this committee, when you remember that five members on the Board of Direction, which has thirty members, constitute a quorum, I think that eight is not too small a number on the Nominating Committee to constitute a quorum for that committee.

Now, there is another change in this, about a director changing his place of residence. That question came up last year before the Nominating Committee, and the present Constitution is so vague and indefinite in regard to that question that it ought to be placed explicitly in our Constitution, so that there could be no doubt whatever of the standing of a director who changes his place of residence. So that we agreed that a director once nominated or elected shall continue to represent that district throughout his term, no matter where he moves, on the theory that he represents—not so particularly his district as the Society itself. If he is a valuable member on the Board of Direction he should still continue on that Board without regard of his place of residence.

I will file this copy with the Secretary, and I move that this meeting adopt this amendment that the Nominating Committee proposes.

MR. CATTELL.—I second the motion.

MR. CROSBY.—I agree fully with that recommendation, but I think that it is a mistake to omit the last paragraph in that section. I

think that there still should be a provision, so that if a quorum should happen, for some reason or other, not to be present, that the parties who did attend that meeting could adjourn to a later date, because, although it might be agreed among the members so that they would think that they would have a quorum and still should something occur there is no provision for their adjourning to another date, as I understood the way he read it.

THE SECRETARY.—There is a provision. It is in another place, that is all. I will read it.

“If at any stated or called meeting of the committee there shall not be a quorum present, then such members as are present shall call an adjourned meeting for the transaction of the committee’s business.”

MR. CROSBY.—Oh, very well then.

THE SECRETARY.—I would like to say that which I omitted to say in presenting this amendment, that this whole question has been under consideration by the Board of Direction for some five or six months, and this amendment as it is here presented is the result of the labor of a committee of the Board of Direction which devoted a long time to it. On that committee there was a Past-President of the Society who has served considerable time on the Nominating Committee. I simply am making this announcement, not to criticize any of the suggestions that have been made by the present Nominating Committee, but in order that the meeting shall understand that this amendment has received most careful consideration, and that really the signatures to the amendment were simply secured in order to get it before this body in proper constitutional form. I have been very familiar with this matter from the start, although I was not on the committee which prepared this amendment, and I think that everything that has been suggested by Mr. Wall as representing the present Nominating Committee would be in accordance with the ideas of those who framed this amendment, except possibly the question of the number for the quorum. In the present amendment there would be much more difficulty in getting a quorum than if the suggestions of the present Nominating Committee giving more latitude as to meetings were adopted. If those suggestions are adopted there would seem to be no reason why that committee should not at some meeting secure a majority of the whole committee, which would be ten. That is the only point that I think might be questioned by those who have devoted so much study to this proposed amendment.

As to the matter of which Mr. Wall has spoken—that a quorum of the Board of Direction is five—that was a provision in the old Constitution which was not changed after the Board of Direction ceased to be small. It was wisely not changed because it enables routine business to be transacted, even should it be impossible for a large number to be present. As a matter of fact, the Board never

does anything but routine business when it does not have a large number of its members present. There are very few meetings of the Board of Direction at the present time that do not have from twelve to sixteen members present. The only point that I wanted to make was that I believe that everything that has been suggested here by Mr. Wall would be in line with the idea of the Board of Direction and of the committee that prepared this amendment except that one suggestion that the number which shall constitute a quorum of the committee shall be eight instead of ten.

H. P. EDDY, M. AM. SOC. C. E.—As I now understand it, there are now two motions before the house, although I am not sure.

THE PRESIDENT.—There is just this one amendment of Mr. Wall's before the house at present.

MR. EDDY.—I wanted to ask if it wouldn't be well, if there are other amendments to come up—if that might be made before taking action to save complication and then proceed to act on the amendments.

THE SECRETARY.—The only other thing is suggested by Mr. James Burden, and it is to insert after the third paragraph of Section 2, a new paragraph to read as follows:

"The travelling expenses of the members of the Nominating Committee to and from its meetings shall be paid by the Society."

Now, for the information of this meeting, I may state that the Board of Direction has already very carefully considered the matter of the payment of the expenses, or rather mileage, of members of the Nominating Committee to the Conventions, and it has decided that it would be unwise to make this provision. Secondly, it does not appear to be a matter which should be incorporated in the Constitution of the Society, inasmuch as it is a matter which can be handled at any time by the Board of Direction, either through action by the Society or on its own initiative. At the present time the mileage of non-resident members of the Board of Direction is paid for attendance at the Directors' meetings. That has been done for some two years or more, and is a great relief, I have no doubt.

F. H. FAY, M. AM. SOC. C. E.—In connection with this last suggestion, I agree heartily with the Secretary that it is unwise to incorporate matters of detail like that in the Constitution, and I wish to say that I have already prepared a resolution which I propose to offer at the first opportunity, touching upon this point.

THE SECRETARY.—That has nothing to do with this amendment?

MR. FAY.—No, sir.

THE SECRETARY.—Here is an amendment that the Secretary would like to suggest:

"Strike out the last five words in the concluding paragraph of the proposed amendment, the words being: 'in accordance with this sec-

tion', so that the last paragraph shall read: "The presiding officer shall announce to the meeting the names of the officers elected."

The argument for this amendment is that the words are unnecessary, and also that the officers are not elected in accordance with that Section only, but in accordance with the whole Article.

C. F. LOWETH, DIRECTOR, AM. SOC. C. E.—It seems to me that we may get somewhat confused if we vote on the amendment as recommended by the Nominating Committee, and I suggest that we take it up paragraph by paragraph.

THE PRESIDENT.—If that is your pleasure, the Secretary will read the paragraphs, and we will act on them as presented.

MR. LOWETH.—It is hardly necessary to read the paragraphs.

THE PRESIDENT.—Well, we are referring to Mr. Wall's amendment now.

THE SECRETARY.—You mean to move that Section 1 of Article VII, as presented by the Nominating Committee be adopted?

MR. LOWETH.—Yes.

THE SECRETARY.—There is no proposed change in that.

MR. CROSBY.—I second that motion.

(Whereupon the motion was put to vote and carried unanimously.)

THE SECRETARY.—The second paragraph of the Section proposed by the present Nominating Committee moves that these words "Seven members holding over and the" be inserted after the words "with the", and before the words "five living last Past-Presidents", so that it will read, "shall be appointed by the meeting to serve for two years; who, with the seven members holding over and the five living last Past-Presidents of the Society, shall be a committee to nominate officers for the Society." There is no change in the intention. It is simply to make clear that there are seven members of the committee holding over.

CHARLES S. CHURCHILL, VICE-PRESIDENT, AM. SOC. C. E.—I move its adoption.

MR. FAY.—I would like to move the adoption of Mr. Wall's substitute for Section 2 of Article VII as a substitute for Section 2 as printed in this printed report.

THE SECRETARY.—That is what we are voting on.

O. E. HOVEY, M. AM. SOC. C. E.—I would second the motion to adopt the substitute amendment of Mr. Wall's.

MR. LOWETH.—If that is the whole of Section 2, let us have the amendment read, please.

THE SECRETARY.—It reads as follows:

"2.—At the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts, shall be appointed by the meeting to serve for two years; who, with the seven members holding over and the five living last Past-

Presidents of the Society, shall be a committee to nominate officers for the Society.

"The Board of Direction may prescribe the mode of procedure for appointing this committee, and fill any vacancies occurring.

"This committee shall meet at the Annual Convention of the Society, or at a time and place to be agreed upon by a majority of its members, but said meeting shall not be later than the fifteenth day of July. At this meeting this committee shall elect from among its members a Chairman and a Secretary to serve one year beginning on the first day of the following September. At all meetings of the committee eight members shall constitute a quorum. If at any stated or called meeting of the committee there shall not be a quorum present, then such members as are present shall call an adjourned meeting for the transaction of the committee's business. This committee shall select nominees to fill the offices named in Article V, with the exception of the office of Secretary, so as to provide, with the officers holding over, a Vice-President and six Directors residing in District No. 1, and twelve Directors divided equally, with regard to number and residence, among the remaining districts, Nos. 2, 3, 4, 5, 6, and 7. In case any nominee or officer shall change his residence from one district to another he shall continue until the election or the expiration of his term of office to represent the district in which he resided when nominated. Nominations under this section shall be designated as 'Official Nominations.'

"A list of the nominees selected for the offices to be filled at the next Annual Election shall be presented by this committee to the Board of Direction not later than the first day of August, and the Secretary shall thereupon immediately notify each nominee of his nomination and ascertain his acceptance or declination."

Now, there is another paragraph which is to be omitted, as I understand it, because it is provided in this, so that the last paragraph of the printed amendment will be amended as incorporated in the other one.

MR. WALL.—The order is changed there, and you will find that same paragraph up above:

"If at any stated or called meeting of the committee there shall not be a quorum present, then such members as are present shall call an adjourned meeting for the transaction of the committee's business."

MR. CROSBY.—I move to amend Mr. Wall's amendment by requiring that the number for a quorum shall be ten instead of eight.

A MEMBER.—I second the motion.

MR. SEAMAN.—There is one matter that should be borne in mind, in this connection, that not only but five members of a Board of thirty constitute a quorum of that Board, but we must bear in mind that, before this committee meets, the members from each district confer with each other and agree upon the name to be presented. That is not a requisite, but I think it is generally customary. In such a case—it

has been done in the past and I believe is still done—a meeting of one member from each of the seven districts would be a voice of the entire committee. Furthermore, when the members of the committee find that they are unable to attend the meetings, it is not unusual to notify those attending of the desires of their district, and it is customary to honor such desires. Considering such facts, my feelings are that the number should be reduced to five or even less, rather than placed at eight or even more. The great danger that this Society is running, in my mind, is placing nominations of its officers in the hands of the Board of Direction. It is necessary to do that as a last resort, but we should exhaust every other expedient before resorting to it. I was inclined to offer an amendment that five members—I think that five is amply sufficient, considering the practice of this committee—that five should constitute a quorum.

MR. FAY.—In explanation of the action of the Nominating Committee, I would say that that committee of nineteen consists, as you know, of fourteen elected members representing seven districts, and five Past-Presidents. The Past-Presidents are looked upon as very valuable advisors to the committee, but it has been our recent experience that but few of the Past-Presidents come to these meetings. At the meeting this year not one of the last five Past-Presidents is here, and we felt that the number eight, which is a majority of the fourteen, representing the Geographical Districts, is amply sufficient to safeguard the interests of the Society, and that that number is as large as it should be made for the proper conduct of the committee's business.

MR. WALL.—I would like to say a word, also, in regard to that. Our idea in letting the committee select its own time and place of meeting, by a voice of the majority of its members, would almost insure the attendance of eight of the members of the committee. For that reason, that was put in, and while there has always been more or less correspondence among the members of the committee—at least in the last two years—in regard to the nomination, the sentiment is pretty well known before the meeting of the committee; and, with this change allowing the committee to select its own time and place of meeting, I do not think there would be any trouble in getting eight; and it seems to me eight members of that committee are ample, and they should constitute a quorum. We should not have ten.

THE PRESIDENT.—The question before you is the amendment of Mr. Crosby's changing the number required for a quorum from eight to ten.

(Whereupon the motion was put to vote and lost.)

THE PRESIDENT.—Now the question is as to the adoption of the amendment as presented by Mr. Wall.

THE SECRETARY.—Might I say just one word: That this is purely a verbal change which I do not understand as it is, and I want to call

attention to it because, if this is to be incorporated in the Constitution, we ought to be careful in the wording. It says:

"In case any nominee or officer shall change his residence from one district to another he shall continue until the election or the expiration of his term of office to represent the district in which he resided when nominated."

Now, I think that paragraph would be stronger if you cut out "the election or." If he moves out of the district and there comes an election, then he is out of it. I would therefore move, Mr. Chairman, to strike out those words "the election or." So that that paragraph will read:

"In case any nominee or officer shall change his residence from one district to another, he shall continue until the expiration of his term of office to represent the district in which he resided when nominated."

It may be that I do not catch the idea of that, but the idea is that a man elected, representing a certain district, shall continue to represent that district until his term of office has expired.

MR. WALL.—You see that says "should any nominee or officer." Now, in case a man should be nominated, and before the election should move into another district, it does not take his name off the ticket. That is the idea in that. That would be a little more clear if it were transposed:

"In case any nominee or officer shall change his residence from one district to another, he shall continue to represent the district in which he resided when nominated, until the election or the expiration of his term of office."

THE SECRETARY.—Hadh't you better write that out. After the words "continue to represent the district in which he resided when nominated until the election or the expiration of his term of office". Take that phrase "until the election or expiration of his term of office"—

THE PRESIDENT.—Will you read it the way it is proposed.

MR. WALL.—"In case any nominee or officer shall change his residence from one district to another, he shall continue to represent the district in which he resided when nominated, until the election or expiration of his term of office."

THE SECRETARY.—Then the nominee who is nominated and changes his residence will only continue to represent the district to which he is not elected until the election?

MR. WALL.—When his name is put upon the ticket he represents his district before the election just the same as after, because he is put on there as a representative of his district for the coming year.

THE SECRETARY.—A man cannot represent his district until he is elected.

MR. EDDY.—That has to do with both nomination and the elected officer. Now the nominees are nominated to represent their district, and in order to cover this point it seemed to the committee that it was necessary that the nominee should represent his district as a nominee until he was elected or defeated, and, after the election, the elected officer should represent his district as an officer until the expiration of the term for which he was elected. Otherwise, we do not provide for the contingency of a nominee moving from one district to another after he is nominated but before he is elected.

MR. FAY.—It seems to me that that point may be covered by changing the word "or" to "and" so as to read "that he shall continue to represent the district in which he resided when nominated until the election and expiration of his term of office". Then, in case a man does not get elected to office, of course he has no term of office and he naturally drops out. Change the word "the" to "his" and the word "or" to "and," reading "continue to represent the district in which he resided when nominated, until his election and expiration of his term of office".

THE SECRETARY.—My only point as against that is, that, according to that wording, a man really does not represent that district until after the election. I do not want to see anything go into the Constitution which would be wrong in construction. I think the idea could be covered by two paragraphs better, to say that a nominee should be placed on the ballot as a nominee of a district from which he was nominated whether he changes his residence before the ballot is issued or not. It seems to me that would be clearer.

MR. SEAMAN.—I would like to remind the Secretary that he represents his district before election, not as a director but as a nominee, and after the election he represents the district as a Director if elected. There is a continual representation there in one capacity or another.

THE SECRETARY.—I have nothing further to say, if it is clear to everybody, and if you think this amendment as it is will be clear to the outsider. It was not clear to me when I read it.

MR. SEAMAN.—It is perfectly clear, as Mr. Fay has put it.

MR. LOWETH.—Doesn't the Constitution require that these gentlemen must be residents of their districts at the time of election?

THE SECRETARY.—The present Constitution does. This is the exception to it. It is intended that if a man does move out of his district, even while he is a nominee, he will continue on the ballot and possibly be elected to represent that district and also serve out his term as a representative of that district. That is the intention of this, as I understand it. I am not trying to argue about that at all; but I do think we ought to have the wording of the Constitution as clear as possible, and it does not seem to me that it is clear.

THOMAS H. JOHNSON, M. AM. SOC. C. E.—There is one feature of this that has not been touched on in the discussion, and which was brought about, not by a party moving out of his district, but by the Board of Direction changing his district and leaving him outside, transferring him to another. Those cases must be covered. It was a case of that kind that brought the question up in the first case.

MR. CROSBY.—Mr. President, wouldn't a change like this straighten the matter out: "In case any nominee or officer"—you see, this not only covers a nominee but it covers an officer—"shall change his residence from one district to another, he shall continue to represent the district in which he resided when nominated or elected." It seems to me that covers the idea that Mr. Wall's amendment covers, and makes it perfectly clear. Also, with regard to the point that the gentleman who last spoke raised, that it does not make any difference whether he does it or it is changed by the Board of Direction.

MR. HOVEY.—I think I see one slight objection to that, that in case a man was nominated to represent on the ticket a certain district and should be forced to remove to another district before election, he would then be elected as a representative of the new district into which he moved, which would give a surplus representation on the Board, and would not conform to the Constitution, and not give an equitable distribution.

MR. WALL.—There is only one other suggestion possible to this matter, and that is to make the moving of a Director or nominee from one district to another—make the very act of his moving equivalent to his resignation from office or vacancy on the ticket, and, to avoid any such thing as that, the Nominating Committee tried to draw up a paragraph here to cover the case so as to allow a representative to continue, and, as the gentleman has just said, if you undertake to let him represent the district he moves into, you will have endless confusion and over-representation in one district instead of electing your members regularly, and you will have no election from here and you will have to elect two the next year.

MR. CROSBY.—I do not understand Mr. Wall's point. I do not see why the amendment as you make it does not still give three directors in one district. If a man moves into another district, just as this amendment says, he continues to represent the district from which he is elected, but it is simply changing the wording to make it clear. "In case any nominee or officer shall change his residence from one district to another, he shall continue to represent the district in which he resided when nominated or elected."

MR. SEAMAN.—Suppose he was nominated in one district and elected in another? Which would he represent?

MR. CROSBY.—He could not be elected in any other district. He is elected in the district for which he is nominated. The effect is exactly the same as the amendment, as I see it.

MR. WALL.—If you say he shall continue to represent the district in which he resided when nominated or elected, he might be nominated in one district and live in another district when elected.

MR. SWEETSER.—Change it to "The district for which he was nominated or elected".

MR. CROSBY.—I accept that.

MR. LOWETH.—I do not like that expression. I prefer the district from which he was nominated. A man that is elected as a Director does not represent only his district but the Society as a whole.

THE SECRETARY.—No man can represent a district until he is elected, and why not strike out the word elected; "for which he is nominated"?

MR. CROSBY.—Leave out the word "elected." "Shall continue to represent the district in which he resided when nominated."

THE PRESIDENT.—This is the amendment to the amendment of Mr. Wall's. Are you ready for the question?

THE SECRETARY.—"In case any nominee or officer shall change his residence from one district to another, he shall continue to represent the district in which he resided when nominated."

(Whereupon the amendment last above recited was put to vote and carried unanimously.)

THE PRESIDENT.—Now the question of the adoption of the whole amendment as amended.

(Whereupon the motion was put to vote and carried unanimously.)

THE PRESIDENT.—Now then, the next section.

THE SECRETARY.—Section 3, in which there has been no change suggested, relates to the sending out of the lists of nominees and the filling of vacancies by the Board, and so on. Section 4 is in regard to additional nominations, and there has been no amendment offered to that. You can take up Section 3.

MR. CROSBY.—I move the adoption of Section 3.

A MEMBER.—I second the motion.

(Whereupon the motion was put to vote and carried.)

THE SECRETARY.—Section 4 relates to additional nominations, and provides that they shall be made by declaration, provided the declaration is accompanied by the acceptance of the nominee and signed by the nominee, and is filed with the Secretary before the first day of December, and further that each declaration shall be signed by twenty-five Corporate Members.

MR. CROSBY.—I move the adoption of Section 4.

A MEMBER.—I second the motion.

(Whereupon the motion was put to vote and carried unanimously.)

THE SECRETARY.—Section 5 relates to the sending out of ballots and the method in which the ballot shall be made out, showing by whom candidates are nominated; a list of the nominating committee; a list

of all those who made additional nominations. There has been no amendment suggested to that, Mr. President, except the last paragraph, as in the originally printed memorandum. The second paragraph of that section reads:

"Voters may strike out the name of any nominee printed on the ballot for whom they do not wish to vote, and may substitute therefor, in writing or by paster, the name of any person eligible for the office. The number of names for each office on the ballot voted shall not exceed the number to be elected to such office, and the vote must be for the proper number of officers resident in each of the seven districts. Ballots not complying with these provisions shall be rejected."

It is proposed to make that read as follows:

"Voters may strike out the name of any nominee printed on the ballot for whom they do not wish to vote, and may substitute therefor, in writing or by paster, the name of any person eligible for the office; but the number of names, voted for for any office shall not exceed the number of persons to be elected to such office. Ballots not complying with these provisions shall be rejected."

The suggested change is to allow a voter, who does not fill out the entire list of officers, to have his ballot counted. He can now vote for Directors in his own district, for instance, and strike out all the others, and still his ballot would be counted.

MR. CROSBY.—I move the adoption of the amendment to the amendment.

A MEMBER.—I second the motion.

(Whereupon the motion was put to vote and carried unanimously.)

THE SECRETARY.—Section 6 relates to the sending in of ballots, and to their being enclosed in sealed envelopes, and the only change I know of in that is that it says that each ballot should be enclosed in two envelopes. In other words, it would not exclude a ballot if a man only put it in one envelope, provided he signs it on the outside, so that his vote could be identified. There is no change in that.

MR. SEAMAN.—I move that it be adopted.

MR. LOWETH.—I second the motion.

(Whereupon the motion was put to vote and carried unanimously.)

THE SECRETARY.—Section 7, in the first paragraph, changes the hour for closing the polls from twelve o'clock noon, to nine o'clock A. M., as a matter of convenience. The remainder of it may be worded differently, but there is no change in the intention, and I move that Section 7 be adopted with the last five words stricken out.

"7.—The polls shall be closed at 9 A. M. on the first day of the Annual Meeting, and the ballots shall be canvassed publicly by tellers, who shall be appointed by the presiding officer.

"The persons who receive the largest number of votes for each office to be filled shall be declared elected.

"In case of a tie between two or more persons for the same office, the Annual Meeting shall elect the officer from among the persons so tied.

"The presiding officer shall announce to the meeting the names of the officers elected."

MR. LOWETH.—Why should you make that nine o'clock? I would like to ask the Secretary if he gets the mail before nine o'clock A. M.

THE SECRETARY.—There are mails coming in all during the day, but the difficulty is this, that we have sometimes some twelve or fifteen hundred votes.

MR. LOWETH.—I understand that, but the question was whether this was definite enough. Some ballots might be brought by members to the Annual Meeting. How can they get them in by nine o'clock? Why not make it midnight of the day before the Annual Meeting.

THE SECRETARY.—Well, the effect would be just the same. There is no objection to that change. The purpose is to get time enough to count the ballots, because if a man brings his vote in to the Annual Meeting and we do not close the polls until twelve o'clock noon that day, it is impossible to go ahead and count the ballots because a man might want to change his ballot, and we would not know whether he had voted or not.

THE PRESIDENT.—At all events, the votes cannot be reported until long after twelve o'clock under the present conditions.

(Whereupon the motion was put to vote and carried unanimously.)

THE PRESIDENT.—Now then, gentlemen, a motion suggesting that this entire amendment be adopted.

THE SECRETARY.—The Constitution provides that this amendment as amended by the meeting, shall be sent to the members for ballot.

A MEMBER.—In Section 5 didn't we vote on the amendment to the amendment only?

THE SECRETARY.—No, it was voted on in the usual manner.

MR. FAY.—Do I understand this proposed amendment to the Constitution is now disposed of?

THE PRESIDENT.—It is. It will go out to the membership for letter-ballot.

MR. FAY.—Then I will offer the following resolution, and I will file a copy with the Secretary.

"RESOLVED, That the Board of Direction be requested to authorize the payment of mileage to members of the Nominating Committee in attendance at the prescribed meetings of said committee, on the same basis as is authorized by the Board for the mileage of its own members attending Board meetings. This action to take effect January 1st, 1913."

It seems to me, Mr. President, as a retiring member of the Nominating Committee who is not affected in any way by this resolution, that

the meetings of the Nominating Committee are among the most important meetings which are held by any part of the Society, including the Board itself. The selection of the officers of the Society, which is all important, is intrusted to the Nominating Committee, and to insure a large attendance at the meetings of the Nominating Committee, and to insure the most careful consideration of the question of the nomination of officers, it seems to me highly desirable that an action like this be adopted, and this is a resolve which recommends and authorizes the payment of mileage by the Board. It is not mandatory. It is simply a recommendation to the Board.

MR. WALL.—I move the adoption of Mr. Fay's resolution. I think I can with propriety make that motion, as I also am a retiring member of the Nominating Committee, and so feel the necessity for such an act.

A MEMBER.—I second the motion.

THE SECRETARY.—I will read the resolution.

"RESOLVED, That the Board of Direction be requested to authorize the payment of mileage to members of the Nominating Committee in attendance at the prescribed meetings of said committee, on the same basis as is authorized by the Board for the mileage of its own members attending Board meetings. This action to take effect January 1st, 1913."

It seems to me that that is a request, and then it looks as if it were an action. I do not quite understand it. Wouldn't it be better to authorize the Board to do it?

MR. SEAMAN.—They have that authority now.

H. D. WOODS, M. AM. SOC. C. E.—This is a request that it be done. Simply a request of this meeting to consider favorably that resolution. It does not bind the Board necessarily.

MR. LOWETH.—I would like to say, by way of explanation, that the expenses of members of the Board attending Board meetings do not cover the Annual Meeting in January nor the Annual Convention.

MR. SEAMAN.—But they do cover meetings of the Board at which the business of the Society is transacted, and this is the only meeting of the Nominating Committee at which the business of the Society is transacted. The only criticism I have is the modesty of those who presented it. I do not see any reason why men who have come from the Far East, at great inconvenience, to say nothing of the expense, should not have mileage to this meeting granted. There are members here who never would have attended except for duty to this Society, and why should we ask them to go into their own pockets for that expense? I would rather move to amend that to take effect June 1st, of the present year.

EUGENE CARROLL, M. AM. SOC. C. E.—I move to strike out the date, "January 1st, 1913," because I think that the present mem-

bers should be recommended to the Board of Direction for action, and by striking out the date it leaves it entirely in the hands of the Board of Direction. I make that as a motion.

MR. SEAMAN.—I second that motion.

THE PRESIDENT.—Do you accept that amendment, Mr. Fay?

MR. FAY.—Well, yes, I will.

MR. SEAMAN.—He doesn't need to if the meeting does.

THE PRESIDENT.—Well, then the question is on the amendment to strike out those words as to the time when the recommendation begins.

(Whereupon the amendment to the resolution was put to vote and carried unanimously.)

THE PRESIDENT.—Now the question as to the adoption of the resolution as amended.

(Whereupon the motion was put to vote and carried unanimously.)

The next in order is Reports from Special Committees. The first is on Reinforced Concrete.

THE SECRETARY.—I have no report from any of those committees, but it is customary to call for them, as some of the committees might be here with their report.

THE PRESIDENT.—Engineering Education?

(No report.)

THE PRESIDENT.—Steel Columns?

(No report.)

THE PRESIDENT.—On Bituminous Materials for Road Construction?

(No response.)

THE PRESIDENT.—On Valuation of Public Utilities?

MR. JOHNSON.—I am the only member of that committee present, and we have no report to make, except that I can report progress in a slow and desultory way.

THE PRESIDENT.—New business is now in order.

MR. JOHNSON.—Do I understand that we are through with all the business before the Convention?

THE PRESIDENT.—Unless you present something in the way of new business.

MR. JOHNSON.—I wish to make a motion returning the thanks of the visiting members to the Local Committee and the Pacific Northwest Association for the complete and glorious manner in which they have entertained us.

SEVERAL MEMBERS.—I second that motion.

(Whereupon the motion was put to vote and carried unanimously.)

Adjourned.

FORTY-FOURTH ANNUAL CONVENTION EXCURSIONS AND ENTERTAINMENTS

The arrangements were in the hands of the following Committees:

Committee of Arrangements of the Board of Direction

CHARLES D. MARX, *Chairman*;
WILLIAM A. CATTELL, CHAS. WARREN HUNT.

Local Committee

SAMUEL H. HEDGES, *Chairman*;
C. E. FOWLER, J. L. HALL,
A. H. FULLER, JOSEPH JACOBS,
E. B. HUSSEY, R. H. OBER,
N. A. CARLE.

Informal Reception

Monday, June 24th, 1912.—8 P. M.—An Informal Reception, which was very largely attended, was held in the Hotel Washington preliminary to an illustrated lecture on Alaska by Maurice D. Leehey, Esq.

Ladies' Luncheon

Tuesday, June 25th.—The ladies of the party were driven in automobiles around the city, and were entertained at luncheon by Mrs. C. E. Fowler.

Excursion to Bremerton Navy Yard

Tuesday, June 25th.—By invitation of the Pacific Northwest Society of Engineers, a party of about 400 started from the Coleman Dock on the Steamer *Kennedy*, and visited the U. S. Navy Yard at Bremerton, where the new dry dock, said to be the largest in the world, as well as several U. S. war ships, were inspected. On the return trip a stop was made at Eagle Harbor to inspect the Creosoting Plant at that point, and Seattle was reached at 6.30 P. M.

Excursion to Tacoma

Wednesday, June 26th.—After the adjournment of the Business Meeting, a party of about 350 started on the Steamer *Kennedy* for Tacoma, where, by invitation of the Tacoma membership of the Society, and of the Commercial Club of Tacoma, luncheon was served at that Club, after which the St. Paul and Tacoma Lumber Company's mill, and other points of interest in Tacoma, were visited. The return to Seattle was made at 6.30 P. M.

Automobile Drive

Thursday, June 27th.—The ladies of the party were entertained at luncheon at the Rainier Club, after which the entire party was taken on a general automobile trip around the City of Seattle. The

first stop was made at the Golf and Country Club, where a group photograph of all present was taken, and the drive was continued along the shores of Lake Washington and through the Seattle park system.

Reception and Ball

Thursday, June 27th.—In the evening there was a well attended Reception, with dancing, at the Hotel Washington, which would doubtless have been kept up later but for the fact that it was necessary for all who intended to make the proposed trip to Mt. Rainier National Park to take a train at 12.30 A. M. on Friday morning.

Excursion to Mt. Rainier

Friday, June 28th.—Nearly 100 participated in this excursion. After leaving the train at an early hour, automobiles took the party to the National Park Inn for breakfast, after which the drive was continued to Nisqually Glacier, returning to the Inn for luncheon. The party left on the return trip at 3 P. M.

Alternative steamer excursions for Friday, June 28th, were provided to Victoria, B. C., and to Sol Duc Hot Springs.

Entertainment at Portland, Ore.

By invitation of the local membership at Portland, Ore., a post-Convention entertainment was provided for those who visited that city on Monday, July 1st, 1912.

Attendance

The following 155 members were in attendance. There were also present 238 ladies and others of the families of members.

Abbott, E. T.	Thrall, Cal.	Butler, A. D. . . .	Spokane, Wash.
Albertson, C.	Seattle, Wash.		
Armstrong, W. R. . . .	Pocatello, Idaho	Carle, N. A.	Seattle, Wash.
		Carroll, Eugene. . .	Butte, Mont.
Babcock, W. S. . . .	New York City	Cattell, W. A.,	
Baker, H. J. M. . . .	Seattle, Wash.		San Francisco, Cal.
Baldwin, E. H. . . .	Ellensburg, Wash.	Chase, Marvin,	
Baldwin, G. C.	Boise, Idaho		Richmond Beach, Wash.
Ball, C. B.	Chicago, Ill.	Chittenden, H. M. .	Seattle, Wash.
Boggs, E. M.	Oakland, Cal.	Churchill, C. S. . .	Roanoke, Va.
Booth, A. A.	Spokane, Wash.	Clapp, J. M.	Seattle, Wash.
Bott, J. B.	Brownsville, Pa.	Clarke, D. D.	Portland, Ore.
Brooks, M. E.,		Connor, E. H.,	
	Tulameen, B. C., Canada		Leavenworth, Kans.
Brownell, E. H.,		Conway, G. R. G.,	
	Bremerton, Wash.		Vancouver, B. C., Canada

Copeland, F. L.Spokane, Wash.
 Corey, R. H.Portland, Ore.
 Corlett, B. E.Seattle, Wash.
 Crosby, B. L.Tacoma, Wash.
 Crowe, F. T.Boise, Idaho

Dater, P. H.Little Falls, N. Y.
 Dean, Bertram D.Seattle, Wash.
 Derleth, C., Jr.Berkeley, Cal.
 Deyo, S. L. F.New York City
 Dimock, Arthur H.Seattle, Wash.
 Downey, A. S.Seattle, Wash.
 Duncan, Lindsay.McGill, Nev.

Eddy, H. P.Boston, Mass.
 Edwards, G. R.,
 Port Townsend, Wash.
 Ewing, William Wallace,
 Vancouver, B. C., Canada

Fay, F. H.Boston, Mass.
 Fowler, C. E.Seattle, Wash.
 Franklin, P. A.Seattle, Wash.
 Franklin, W. H.Seattle, Wash.
 Fry, A. B.New York City
 Fuller, A. H.Seattle, Wash.

Gerig, William.Medford, Ore.
 Goodwin, G. E.Big Eddy, Ore.
 Goss, O. P. M.Seattle, Wash.
 Grant, L. M.Seattle, Wash.
 Gray, H. L.Olympia, Wash.

Hall, J. L.Seattle, Wash.
 Halsey, M. C.Monrovia, Cal.
 Hartwell, Harry,
 Victoria, B. C., Canada
 Haselton, G.Portland, Ore.
 Hedges, S. H.Seattle, Wash.
 Herring, W. E.Portland, Ore.
 Hoard, Clarence,
 Victoria, B. C., Canada
 Holbrook, F. W. D.,
 Bremerton, Wash.
 Holt, A. G.Spokane, Wash.

Hopson, E. G.Portland, Ore.
 Horrocks, J. I.Seattle, Wash.
 Hough, U. B.Spokane, Wash.
 Hovey, O. E.Plainfield, N. J.
 Howe, George E.Wauseon, Ohio
 Howes, Robert.Seattle, Wash.
 Hunt, Chas. Warren,
 New York City

Hunt, G. A.San Francisco, Cal.

Jackson, Jesse A.Seattle, Wash.
 Jacobs, Joseph.Seattle, Wash.
 Jamieson, J. Q.Portland, Ore.
 Johnson, F. M.Seattle, Wash.
 Johnson, T. H.Pittsburgh, Pa.
 Jones, W. H.,
 Vancouver, B. C., Canada

Kimball, G. A.Boston, Mass.
 Kittredge, F. A.Seattle, Wash.
 Koon, R. E.Bend, Ore.

Lee, C. H.Los Angeles, Cal.
 Lewis, J. H.Salem, Ore.
 Lichtner, W. O.,
 Newton Highlands, Mass.

Lockwood, J. B. C.Portland, Ore.
 Loe, E. H.Seattle, Wash.
 Loomis, Horace.New York City
 Loweth, C. F.Chicago, Ill.
 Lundgren, E. L.Chicago, Ill.
 Lyon, Henry L.Buffalo, N. Y.

Macy, E. C.Bellingham, Wash.
 McCaustland, E. J.Seattle, Wash.
 McCrickett, T. F.Detroit, Mich.
 McCrory, T. G.Tacoma, Wash.
 McGonigle, C. J.Portland, Ore.
 McMorris, Daniel W.,
 Seattle, Wash.

McNaugher, D. W.,
 Pittsburgh, Pa.
 Mason, George Cotner,
 Portland, Ore.
 Mason, S. D.Fort Worden, Wash.

- Melvin, D. N.,
Port Richmond, N. Y.
- Moody, J. E. . . . Tacoma, Wash.
- Montfort, R. . . . Louisville, Ky.
- Morrow, J. J. . . . Portland, Ore.
- Muchemore, H. L.,
Bremerton, Wash.
- Mulholland, William,
Los Angeles, Cal.
- Münster, A. W. . . . Seattle, Wash.
- Murray, J. F. . . Philadelphia, Pa.
- Murray, S. Seattle, Wash.
- Murtaugh, M. M.,
Salt Lake City, Utah
- Nelson, A. T. . . . Seattle, Wash.
- Newton, J. P. . . . Albany, N. Y.
- Nichol, H. S.,
Victoria, B. C., Canada
- Nimmo, J. V.,
Lytton, B. C., Canada
- Norris, R. V. . Wilkes-Barre, Pa.
- Ockerson, J. A. . . St. Louis, Mo.
- Parker, G. L. . . . Portland, Ore.
- Paul, Charles H. . . Boise, Idaho
- Phillips, J. C. Fort Flagler, Wash.
- Phillips, S. B. . . . Seattle, Wash.
- Phipps, T. E. . . . Seattle, Wash.
- Pitman, F. L. . . . Spokane, Wash.
- Plummer, H. E. . . Portland, Ore.
- Powell, A. O. . . . Seattle, Wash.
- Purdy, C. T. . . . New York City
- Raleigh, W. C. . . Tacoma, Wash.
- Ralston, J. C. . . . Spokane, Wash.
- Ramsey, Joseph, Jr.,
New York City
- Reeves, Carl H. . . Seattle, Wash.
- Roberts, W. J. . . Olympia, Wash.
- Robinson, W. R. . Springfield, Ill.
- Rust, C. H.,
Victoria, B. C., Canada
- Sanders, W. H. Los Angeles, Cal.
- Sargent, A. W. . . . Seattle, Wash.
- Savage, J. L. Boise, Idaho
- Schermerhorn, H. O. Troy, N. Y.
- Scholtz, H. F. . Bremerton, Wash.
- Seaman, H. B. . . . New York City
- Shannon, W. D. . Sumner, Wash.
- Sinks, F. F. Seattle, Wash.
- Smith, C. U. . . . Spokane, Wash.
- Smith, R. E. Seattle, Wash.
- Smith, W. D. . . . Seattle, Wash.
- Squire, H. E. . Bremerton, Wash.
- Steinman, D. B. . Moscow, Idaho
- Strandberg, G. R. . Seattle, Wash.
- Sweetser, C. H. . . Tacoma, Wash.
- Tilmot, P. A. G. . . Kelso, Wash.
- Triest, W. G. . . . New York City
- Trowbridge, A. L.,
San Francisco, Cal.
- Turner, W. S. . . . Portland, Ore.
- Vent, F. G. Chicago, Ill.
- Vorce, C. B.,
Vancouver, B. C., Canada
- Waddell, J. A. L.,
Kansas City, Mo.
- Wall, E. E. St. Louis, Mo.
- Ward, C. C. Neppel, Wash.
- Warfield, Ralph M.,
Bremerton, Wash.
- Warrack, J. B.,
Sedro-Woolley, Wash.
- Wood, A. B. . Cottage Grove, Ore.
- Woods, H. D.,
West Newton, Mass.
- Yappen, Adolph. . . Chicago, Ill.

ANNOUNCEMENTS

The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

FUTURE MEETINGS

September 4th, 1912.—8.30 P. M.—A regular business meeting will be held, and a paper by Ernest McCullough, M. Am. Soc. C. E., entitled "Engineering Education in Its Relation to Training for Engineering Work," will be presented for discussion.

This paper is printed in *Proceedings* for May, 1912.

September 18th, 1912.—8.30 P. M.—At this meeting two papers will be presented for discussion, as follows: "Street Sprinkling in St. Paul, Minn.," by C. L. Annan, M. Am. Soc. C. E.; and "A Western Type of Movable Weir Dam," by W. C. Hammatt, M. Am. Soc. C. E.

These papers are printed in *Proceedings* for May, 1912.

October 2d, 1912.—8.30 P. M.—This will be a regular business meeting. Ballots on the proposed amendment of Article VII of the Constitution will be canvassed, and a paper by H. G. Burrowes, M. Am. Soc. C. E., entitled "The Sixth Avenue Subway of the Hudson and Manhattan Railroad," will be presented for discussion.

This paper is printed in this number of *Proceedings*.

October 16th, 1912.—8.30 P. M.—Two papers will be presented for discussion at this meeting, as follows: "A Brief Description of a Modern Street Railway Track Construction," by A. C. Polk, Assoc. M. Am. Soc. C. E.; and "Construction of a High-Service Reservoir at Baltimore, Md.," by P. A. Beatty, M. Am. Soc. C. E.

These papers are printed in this number of *Proceedings*.

November 6th, 1912.—8.30 P. M.—A regular business meeting will be held, and a paper by Kenneth C. Grant, Assoc. M. Am. Soc. C. E., entitled "The Flood of March 22d, 1912, at Pittsburgh, Pa.," will be presented for discussion.

This paper is printed in this number of *Proceedings*.

INDEX TO TRANSACTIONS

The Board of Direction has recently authorized the publication of an Index covering the 74 volumes of *Transactions* issued to date. This Index is now in course of preparation, will be put through the press as soon as possible, and it is hoped will be forwarded to the entire membership of the Society before the close of the year.

VISIT OF THE MEMBERS OF THE TWELFTH INTERNATIONAL CONGRESS OF NAVIGATION TO NEW YORK CITY

By special request of the General Secretary of the Twelfth International Congress of Navigation, the visit of the delegates to the City of New York was under the auspices of the American Society of Civil Engineers.

A reception was held at the House of the Society on the evening of June 3d, 1912, and the delegates were addressed by President John A. Ockerson, and welcomed to the City by the Hon. George McAneny, President of the Borough of Manhattan. Addresses were also delivered by representatives of all the Foreign Governments present. The attendance was about 175.

On Tuesday, June 4th, the members were guests of the City of New York and its Department of Docks and Ferries on an all-day excursion around the harbor. The party, consisting of about 700, left the dock at the Whitehall Terminal, Battery Park, at 10.30 A. M., on one of the new municipal ferry-boats. Luncheon was served on board, and, after a very pleasant trip to many of the more interesting parts of the harbor, the party landed at about 5 P. M.

On Wednesday, June 5th, a large party assembled in the temporary concourse of the Grand Central Palace, where, through the courtesy of George W. Kittredge, M. Am. Soc. C. E., Chief Engineer, N. Y. C. & H. R. R. R., and George A. Harwood, M. Am. Soc. C. E., Chief Engineer, Electric Zone Improvements, they were met by representatives of the Engineering Department of the New York Central and Hudson River Railroad, and conducted through the new Grand Central Station now under construction.

The party (about 200) was entertained at luncheon by the Society at the Manhattan Hotel. In the absence of the President, the Secretary presided, and interesting speeches were delivered by representatives of each of the Foreign Governments represented at the Congress.

After luncheon the party proceeded by the subway to the Nevins Street Station, Brooklyn, from which point, through the courtesy of Alfred Craven, M. Am. Soc. C. E., Chief Engineer, Public Service Commission, and of William Bradley, and the E. E. Smith Contracting Company, the Fourth Avenue Subway work, now under construction, was inspected.

SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many

searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

In reference to this work, the Appendices* to the Annual Reports of the Board of Direction for the years ending December 31st, 1906, and December 31st, 1910, contain summaries of all searches made to date.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and, on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which, from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions, only, will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

* *Proceedings*, Vol. XXXIII, p. 20 (January, 1907); Vol. XXXVII, p. 28 (January, 1911).

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Association

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 p. m., at the Palace Hotel, on the third Friday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 p. m. every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary of the Association, E. T. Thurston, Jr., M. Am. Soc. C. E., 713 Mechanics' Institute, 57 Post Street.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

(Abstract of Minutes of Meeting)

April 19th, 1912.—The meeting was called to order; President Grunsky in the chair; E. T. Thurston, Jr., Secretary; and present, also, 71 members and guests.

President Grunsky and Otto von Geldern, Secretary of the General Committee of the proposed Engineering Congress in 1915, reported progress.

The Secretary read a communication suggesting a readjustment of the Geographical Districts to correct the present representation, and the discussion was ordered laid over.

M. M. O'Shaughnessy, M. Am. Soc. C. E., read a paper on the Water Supply of San Diego, Cal., and the Construction of the Morena Rock Fill Dam in connection therewith, illustrating his remarks with stereopticon views. The paper, which was a résumé of that published in the *Proceedings* of the Society in October, 1911, and a reply to the discussions published in the *Proceedings* of January and March, 1912, was discussed by a number of the members present.

Adjourned.

Colorado Association

The meetings of the Colorado Association of Members of the American Society of Civil Engineers are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary, Gavin N. Houston, M. Am. Soc. C. E., 409 Equitable Building, Denver, Colo. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesdays, and, until further notice, will take place at the Colorado Traffic Club.

Visiting members are urged to attend the meetings and luncheons.

(Abstracts of Minutes of Meetings)

April 20th, 1912.—Instead of the regular meeting of the Association, a meeting of engineers and others interested in engineering in

the State was held at the University of Colorado, Boulder, Colo., under the auspices of the Association.

The party from Denver included 90 members and guests, representing the Scientific Society of Colorado, The Colorado Electric Club, The American Society of Mechanical Engineers, The American Institute of Architects, and the Association. On arriving at the University, the members of the party made an inspection of the laboratories and shops and were afterward entertained as guests of the Associated Students of the University at a baseball game between the University and Sacred Heart College.

The formal meeting was called to order at 5 p. m.; President Anderson in the chair; and the following papers and addresses, outlining the work done in the various Engineering Departments of the University and in the United States Timber Testing Station, were presented: "The United States Timber Testing Station," by Norman DeW. Betts; "The Road Materials Testing Laboratory and Laboratory of Applied Mechanics," by Clement C. Williams, Jun. Am. Soc. C. E.; "Laboratory Work in Mechanical Engineering," by Professor John Hunter; "Laboratory Work in Electrical Engineering," by Professor Herbert S. Evans; "Aim and Organization of College of Engineering," by Milo S. Ketchum, M. Am. Soc. C. E.

In the evening the Regents of the University entertained the party at dinner, about 160 members and guests being present, after which President Anderson, acting as Toastmaster, introduced the following speakers: Messrs. A. D. Parker, Allison Stocker, George E. Collins, Thomas B. Stearns, James H. Baker, and Rody Kenehan. The party left Boulder about 11 p. m. on the return trip to Denver.

May 11th, 1912.—The meeting was called to order; Vice-President C. W. Comstock in the chair; G. N. Houston, Secretary; and present, also, 6 members and 7 guests.

The minutes of the April meeting were read and approved.

A committee, consisting of Messrs. C. C. Williams, E. F. Vincent, and R. W. Toll, was appointed to nominate officers for the ensuing year.

Messrs. John E. Field, A. O. Ridgway, and G. N. Houston, were appointed a committee to outline a programme for the meetings for 1912-1913.

The subject for discussion, "Flumes," was introduced by John E. Field, M. Am. Soc. C. E., who submitted drawings or models of most of the metal flumes on the market, and the subject was discussed further by Messrs. L. R. Hinman, Hess, Wood, Rankin, and M. Hawkins.

Adjourned.

June 22d, 1912.—The Annual Meeting was called to order; Vice-President Comstock in the chair; G. N. Houston, Secretary; and present, also, 7 members.

The minutes of the May meeting were read and approved.

The Annual Report of the Secretary-Treasurer was read and approved, and ordered printed.

The Secretary read the President's Annual Address, which was ordered printed in the Annual Pamphlet issued by the Association.

The Secretary was instructed to cast the ballot of the Association in favor of a vote of thanks to President Anderson and Vice-President Comstock for the able manner in which they have presided over the affairs of the organization and for their untiring efforts for its success.

Messrs. Jewett, Crocker, and Sampson were appointed Tellers to canvass the ballot for officers, and Vice-President Comstock announced the result, as follows:

President, M. S. KETCHUM,
Vice-President, A. O. RIDGWAY,
Secretary-Treasurer, G. N. HOUSTON.

The matter of the programme was discussed informally, and the Committee on Programme was instructed to report to the Executive Committee.

Adjourned.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms and at all Meetings:

American Institute of Mining Engineers, 29 West Thirty-ninth Street,
New York City.

American Society of Mechanical Engineers, 29 West Thirty-ninth
Street, New York City.

Architekten-Verein zu Berlin, Wilhelmstrasse 92, Berlin W. 66,
Germany.

Associação dos Engenheiros Cívis Portuguezes, Lisbon, Portugal.

Australasian Institute of Mining Engineers, Melbourne, Victoria,
Australia.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston,
Mass.

Brooklyn Engineers' Club, 117 Remsen Street, Brooklyn, N. Y.

Canadian Society of Civil Engineers, 413 Dorchester Street, West,
Montreal, Que., Canada.

Civil Engineers' Society of St. Paul, St. Paul, Minn.

Cleveland Engineering Society, Chamber of Commerce Building,
Cleveland, Ohio.

Cleveland Institute of Engineers, Middlesbrough, England.

Dansk Ingeniørforening, Amaliegade 38, Copenhagen, Denmark.

Engineers' and Architects' Club of Louisville, Ky., 303 Norton
Building, Fourth and Jefferson Streets, Louisville, Ky.

Engineers' Club of Baltimore, Baltimore, Md.

Engineers' Club of Minneapolis, 17 South Sixth Street, Minneapolis,
Minn.

Engineers' Club of Philadelphia, 1317 Spruce Street, Philadelphia, Pa.

Engineers' Club of St. Louis, 3817 Olive Street, St. Louis, Mo.

Engineers' Club of Toronto, 96 King Street, West, Toronto, Ont., Canada.

Engineers' Society of Northeastern Pennsylvania, 302 Board of Trade Building, Scranton, Pa.

Engineers' Society of Pennsylvania, 219 Market Street, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania, 2511 Oliver Building, Pittsburgh, Pa.

Institute of Marine Engineers, 58 Romford Road, Stratford, London, E., England.

Institution of Engineers of the River Plate, Buenos Aires, Argentine Republic.

Institution of Naval Architects, 5 Adelphi Terrace, London, W. C., England.

Junior Institution of Engineers, 39 Victoria Street, Westminster, S. W., London, England.

Koninklijk Instituut van Ingenieurs, The Hague, The Netherlands.

Louisiana Engineering Society, 321 Hibernia Bank Building, New Orleans, La.

Memphis Engineering Society, Memphis, Tenn.

Midland Institute of Mining, Civil and Mechanical Engineers, Sheffield, England.

Montana Society of Engineers, Butte, Mont.

North of England Institute of Mining and Mechanical Engineers, Newcastle-upon-Tyne, England.

Oesterreichischer Ingenieur- und Architekten-Verein, Eschenbachgasse 9, Vienna, Austria.

Pacific Northwest Society of Engineers, 803 Central Building, Seattle, Wash.

Rochester Engineering Society, Rochester, N. Y.

Sachsischer Ingenieur- und Architekten-Verein, Dresden, Germany.

Sociedad Colombiana de Ingenieros, Bogota, Colombia.

Sociedad de Ingenieros del Peru, Lima, Peru.

Societe des Ingenieurs Civils de France, 19 Rue Blanche, Paris, France.

Society of Engineers, 17 Victoria Street, Westminster, S. W., London, England.

Svenska Teknologforeningen, Brunkebergstorg 18, Stockholm, Sweden.

Tekniske Forening, Vestre Boulevard 18-1, Copenhagen, Denmark.

Western Society of Engineers, 1737 Monadnock Block, Chicago, Ill.

ACCESSIONS TO THE LIBRARY

(From May 3d to August 9th, 1912)

DONATIONS*

SEWAGE DISPOSAL.

By George W. Fuller, M. Am. Soc. C. E. Cloth, $9\frac{1}{2} \times 6\frac{1}{2}$ in., illus., 15 + 767 pp. New York and London, McGraw-Hill Book Company, 1912. \$6.00.

The author's aim has been to record, in this book, the more important recent developments in the field of sewage disposal and to give the present status of both theory and practice, with the hope that the results recorded may be of help to the engineer who has to design and build disposal works, either for dispersion in large bodies of water, or for clarification, filtration, or sterilization. The subject-matter is divided into four parts of which the first is stated to be devoted to descriptions of the composition of sewage and the behavior of bacterial and biochemical processes in the decomposition of sewage. In this part attention is called to the detailed explanations of the significance of sewage disposal problems and to the relation of sewage bacteria to shellfish pollution. The second part of the book is said to relate to recital of American experiences in sewage disposal by dilution in inland streams, lakes, tidal estuaries, and oceans, the limiting factors and conditions in present practice being fully described. In the third part, the preparatory arrangements for the treatment of sewage are dealt with, and screening, settling tanks, septic tanks, etc., are stated to be discussed in detail particularly septification in two-story tanks. The fourth section is devoted to filtration matters with a view to recording present practice. Aeration, sterilization, and ozonization processes are discussed, with a few descriptions of institutional and residential plants, and a comparative summary of general costs and efficiencies is also included. The Contents are: Composition of Sewage; Aerobic and Anaerobic Decomposition of Sewage; Sewage Bacteria as Related to Offensive Odors; Sewage Bacteria as Related to Public Water Supplies; Sewage as Related to Shellfish; The Problem of Sewage Disposal; Experimental Methods as Applied to Sewage Disposal Problems; Dilution in Inland Streams; Dilution in Large Lakes; Dilution in Oceans and Tidal Estuaries; Sewage Treatment Works; Screening; Plain Sedimentation; Septicization in Connection with Sedimentation; Chemical Precipitation in Connection with Sedimentation; Electrolytic Treatment; Strainers, Slate Beds, and Colloids; Broad Irrigation; Intermittent Sand Filtration; Contact Filters; Sprinkling Filters; Aeration; Hypochlorite Treatment; Ozonization; Institutional and Residential Plants; Comparative Summary; Index.

THE SUBWAYS AND TUNNELS OF NEW YORK:

Methods and Costs, with an Appendix on Tunneling Machinery and Methods and Tables of Engineering Data. By Gilbert H. Gilbert, Lucius I. Wightman, and W. L. Saunders, M. Am. Soc. C. E. Cloth, $9\frac{1}{2} \times 6\frac{1}{2}$ in., illus., 14 + 372 pp. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1912. \$4.00.

As stated in the secondary title, this book is a record of the tunneling operations for the system of subways and tunnels in and about New York City, which represent, it is said, engineering and contract achievement of such vast importance as to mark a new era in construction work. The authors describe the methods used and the costs of the various undertakings and in the Appendices, give descriptions of tunneling machinery and methods. The Chapter headings are: Topography, Geological Formation and Historical Data; The Original Hudson Tunnel; The East River Gas Tunnel; Manhattan-Bronx Division of the New York Subway; The Brooklyn-Manhattan Division of the New York Subway; Compressed Air in Subway Construction, Costs of Excavation in the New York Subway; The Pennsylvania Railroad Developments In and Near New York City; Bergen Hill Tunnels of the Pennsylvania Railroad; North River Tunnels of the Pennsylvania Railroad; Excavation for the Terminal Station of the Pennsylvania Railroad; Cross-Town Tunnels of the Pennsylvania Railroad; The East River Tunnels of the Pennsylvania Railroad; The Belmont Tunnels; The Hudson-Manhattan Tunnels; the Hudson Terminal Station of the Hudson-Manhattan Tunnels; Appendices; Index.

*Unless otherwise specified, books in this list have been donated by the publishers.

VALUATION OF PUBLIC SERVICE CORPORATIONS:

Legal and Economic Phases of Valuation for Rate Making and Public Purchase. By Robert H. Whitten. Cloth, $9\frac{1}{2} \times 6$ in., 40 + 798 pp. New York, The Banks Law Publishing Co., 1912. \$5.50.

This book, it is stated, is a complete and economic treatment covering all phases of the valuation of public service property, and is designed for the use of public utility managers, accountants, engineers, etc. The subject-matter includes detailed studies of specific cases with full quotations from reports and court decisions bearing on all elements of valuation, and for each subject there is given a brief summary of the law and precedents, together with a full statement or discussion of the economic principles involved in determining a fair value. There is also a full bibliography of valuation and depreciation, which is supplemented by a table of cases annotated so as to indicate the important topics of valuation treated in each case. The Chapter headings are: Table of Cases Cited; Purpose of Valuation; Fair Value for Rate Purposes; Market Value as a Standard for Rate Purposes; Cost of Reproduction as a Standard of Value for Rate Purposes; Actual Cost as a Standard of Value for Rate Purposes; Valuation of Land; Pavement Over Mains; Property Donated or Acquired Without Cost; Property Constructed Out of Surplus; Unused Property; Average Price *v.* Present Price; Overhead Charges; Discount on Bonds; Working Capital; Piecemeal Construction; Adaptation and Solidification; Physical Depreciation; Cost-New *v.* Cost-Less-Depreciation; Functional Depreciation; Annual Depreciation Allowances; Going Concern in Purchase Cases; Going Concern in Rate Cases; Going Concern as the Value of a Created Income; Going Value Rule of Wisconsin Railroad Commission; The Theory of Going Concern Value; Franchise Value in Purchase Cases; Franchise Value in Rate Cases; Appraisal of Franchise Value; The Theory of Franchise Value; Rate of Return; Rules for Appraisers in Maine Condemnation Cases; Bibliography of Valuation and Depreciation; Index.

CONCRETE COSTS.

Tables and Recommendations for Estimating the Time and Cost of Labor Operations in Concrete Construction and for Introducing Economical Methods of Management. By Frederick W. Taylor and Sanford E. Thompson, M. Am. Soc. C. E. Cloth, 8×5 in., illus., 22 + 709 pp. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1912. \$5.00.

The authors hope that this book will be used by architects, engineers, and contractors in making accurate estimates of the cost of concrete works and structures; by contractors, superintendents, and foremen in planning and laying out their work so that their material will be more economically handled and used and that each workman will do more and better work; and by the building trades as an aid in the introduction of principles of scientific management in their work. For these reasons the treatment of unit times and costs of concrete construction has been made, it is stated, from the standpoint of rough approximate estimates, accurate detailed estimates, economical layout of work, and scientific management with task and bonus. The approximate costs of miscellaneous concrete work and cost data, given in Chapter I and II, are intended simply as a guide in making very rough estimates. The tables and curves in Chapter III will give, it is stated, a general idea of the probable cost of a building and may also be used in comparing the cost of different designs. In Chapters IV and V methods of making time studies, planning of work, and setting tasks are discussed, together with labor costs. Chapters VI to XIII, inclusive, treat of concrete construction, and include the economical selection and proportioning of materials, quantities of materials required, cost of materials, and labor costs in the preparation of materials. Form construction is discussed in detail in Chapters XIV to XVI, inclusive, which also give, it is said, drawings showing important details of form design as developed by the authors after a thorough study of methods in use by the best practical constructors. The remainder of the book, Chapters XVII to XXIII, inclusive, is devoted to tables for use in the preparation of form designs and of estimates. In Chapter XXIII an outline for making up estimates on building construction is given, which includes an example showing the methods of using the tables of volumes and the tables of times and costs in practical estimates. The Contents are: Approximate Costs of Miscellaneous Concrete Work; Approximate Cost Data on Concrete Structures; Approximate Costs of Reinforced Concrete Buildings; Determination of Labor Costs; Task-Work in Construction; Proportioning Concrete; Tables of Quantities of Materials for Concrete and Mortar; Cost of Concrete Materials; Excavating and Crushing Stone for Concrete; Handling and Transporting Materials; Labor of Hand Mixing; Machinery Plants for Mixing and Handling Concrete; Labor Costs of Machine Mixing; Forms for Mass Concrete; Arch Centers; Forms for Reinforced Concrete; Tables of Concrete Volumes;

Tables of Steel Areas and Quantities; Tables of Times and Costs Bending and Placing Steel; Tables for Designing Forms; Tables of Quantities of Lumber for Forms; Tables of Times and Costs of Labor on Forms; Estimates for Reinforced Concrete Construction; Index.

THE POLYTECHNIC ENGINEER, 1912.

Published Annually by the Undergraduates of the Polytechnic Institute of Brooklyn. Vol. XII. Cloth, $9\frac{1}{2} \times 6\frac{1}{4}$ in., illus., 132 pp. Brooklyn, The Polytechnic Engineer, 1912. \$1.25. (Donated by the Polytechnic Institute.)

The Contents are: Rush Hour Traffic Conditions, by Samuel Sheldon; The Course of Civil Engineering at the Polytechnic Institute of Brooklyn, by Clarence W. Hudson; Delicacy of Flame Reactions, by Irving W. Fay and Everitt J. Cole; Deflection Due to Shear, by Edward J. Squire; What is the Fourth Dimension? by William J. Berry; Effective Current Values of Decadent Electric Oscillation, by Erich Hausmann; Testing and Manufacture of Smokeless Powder at the United States Naval Proving Ground, by John C. Olsen; Pollution of New York Harbor by Sewage Disposal, by George W. Oxley; Equivalent Tooth Cross-Sections of Dynamors, by Raymond J. Fichthorn; The Selection of Material for Machine Parts, by C. W. Gremple; The Solution of Exponential Equations by Means of the Hyperbolic Functions, by Hazen G. Tyler; Preparation of Selenium Dyes, by Olan Ivan Lee; The Economizer in a Steam Power Plant, by George W. Weitlauf; Problems of the Manufacture of C. P. Acids, by J. T. Baker; Determination of the Economic Depths of Stringers, by James W. Anderson; A Wireless Telegraph Station, by Irving Weed; The Arched Core Wall of the Middle Dike of the Ashokan Reservoir, by Orrin L. Brodie.

THE TWELVE PRINCIPLES OF EFFICIENCY.

By Harrington Emerson. Cloth, $7\frac{1}{2} \times 5\frac{1}{4}$ in., 18 + 423 pp. New York, The Engineering Magazine, 1912. \$2.00.

In this volume, the author, it is stated, reduces the doctrine of efficiency to a code on which to base rules of practice, and defines twelve principles by which efficiency is determined. Five of these principles are said to concern the relations between men, or employer and employee, the other seven relating to methods or institutions and systems established in the manufacturing plant or in the operating and distributing company. In his first chapter, the author shows that theories of organization and principles, and not men, materials, money, etc., are the prime instruments for efficiency, and, in his second chapter, he outlines and contrasts the two types of organization, showing which is the better adapted to secure efficiency. Each of the following twelve chapters deals with one of the principles, and the last two chapters are devoted to the applications of these principles. The Contents are: Organization and Principles the Prime Instruments for Efficiency; The Type of Organization Through Which Efficiency is Attained; the First Principle: Clearly Defined Ideals; the Second Principle: Common Sense; the Third Principle: Competent Counsel; the Fourth Principle: Discipline; the Fifth Principle: The Fair Deal; the Sixth Principle: Reliable, Immediate and Adequate Records; the Seventh Principle: Despatching; the Eighth Principle: Standards and Schedules; the Ninth Principle: Standardized Conditions; the Tenth Principle: Standardized Operations; the Eleventh Principle: Written Standard-Practice Instructions; the Twelfth Principle: Efficiency Reward; Efficiency Principles Applied to Measurement and Cure of Wastes; Executive Control of Line and Staff.

ENGINEERING DIRECTORY.

1912 Edition. Leather, 7 x 4 in., illus., 1496 pp. Chicago, The Crawford Publishing Co., 1912. \$5.00.

This book, it is stated, aims to be a complete directory of the plumbing, heating, lighting, power plant, and mill supply industries in the United States, and is intended for the jobber, manufacturer, and retailer of these goods. The Contents are: Jobbers and Dealers in Mill, Steam, Mine, Heating and Lighting Supplies, Tools and Machinery, in the United States; Jobbers of Plumbing, Steam and Gas Fitting Supplies in the United States; Dealers in Plumbing, Steam and Mill Supplies in Canada; Wholesale Dealers in Hardware in the United States; Wholesale Dealers in Electrical Supplies in the United States and Canada; Manufacturers' Agents, Representing Manufacturers of Mill, Steam, Mine, Plumbing and Heating Supplies; Alphabetical List of Manufacturers of Plumbing, Heating, Lighting, Mill, Steam, and Mine Supplies in the United States; Classified Directory of Manufacturers of Plumbing, Heating, Lighting, Mill, Steam and Mine Supplies in the United States; Purchasing Agents of the Principal Railways in the United States, Canada, and Mexico; Leading Architects in the United States; Electric Lighting and Power Plants in the United States and Canada; Gas Companies

in the United States; Water-Works Companies in the United States; Trade Associations and Their Officers; Declaration of Principles and List of Members of the American Supply and Machinery Manufacturers' Association; Cross Index to Manufactured Articles Classified in This Directory.

THE DESIGN OF MINE STRUCTURES.

By Milo S. Ketchum, M. Am. Soc. C. E. Cloth, 9 x 6½ in., illus., 16 + 459 pp. New York, McGraw-Hill Book Company, 1912. \$4.00.

The author's aim, it is stated, has been to present, in this work, a systematic discussion of the design of mine structures. The design of headworks for mines is given the principal place in the subject-matter, but the design of buildings, bins, coal washers, breakers, etc., is also discussed. A knowledge of the operation of mines and of the various preparatory processes for ore and coal is necessary to the structural engineer, but the author has limited such discussion to its effect on mine structures. A brief discussion of the calculation of stresses in statically indeterminate structures is presented as well as a résumé of the design of reinforced concrete structures, which includes specifications for steel, timber, and concrete mine structures. Cost data are fully given and numerous examples of actual structures are described in detail. The Contents are: Part I, The Design of Head Works for Mines: Types of Head Works for Mines; Hoisting from Mines; Stresses in Simple Head Frames; Stresses in Statically Indeterminate Structures; Stresses in Statically Indeterminate Head Frames; The Design of Head Frames; The Design of Coal Tipples. Part II, The Design of Mine Buildings: Stresses in Roof Trusses and Frame Structures; The Design of Roof Trusses and Steel Frame Buildings; The Design of Bins and Retaining Walls; The Design of Coal Washers; The Design of Coal Breakers; Miscellaneous Structures. Part III, Details of Design and Cost of Mine Structures: Details of the Design of Steel Structures; Estimate of Weight and Cost of Mine Structures. Appendix I, Specifications for Steel Mine Structures; Appendix II, Specifications for Timber Mine Structures; Appendix III, Reinforced Concrete Structures; Index.

ELECTRICAL INJURIES

Their Causation, Prevention and Treatment: Designed for the Use of Practical Electrical Men. By Charles A. Lauffer. Cloth, 6½ x 4 in., illus., 6 + 77 pp. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1912. 50 cents.

The managements of American railroads and of many industrial establishments provide, it is stated, for the instruction of employees in first aid and in the theory and practice in the art of artificial respiration which is described in this book. The author has had many inquiries relating thereto, it is said, and this book contains articles in which precautions leading to the prevention of injuries received in the industrial application of electricity are discussed, together with methods of rendering effectual aid in case of such injuries. Short articles on minor surgery, infections, etc., are also included. The Contents are: Electrical Injuries; Minor Surgery and First Aid; Infections; The Effects of Occupation on Health; Questions on Electrical Injuries; Questions on Minor Surgery; Questions on Infection; Questions on Health and Occupation.

HISTORY OF THE ENGINEERING CONSTRUCTION AND EQUIPMENT

Of the Pennsylvania Railroad Company's New York Terminal and Approaches. Edited by Wm. Couper, Former Acting Secretary, Board of Engineers. Cloth, 11 x 9 in., illus., 131 pp. New York, Isaac H. Blanchard Company, 1912. \$2.00.

The Contents are: Foreword, by Wm. Couper; Proceedings at the Dedication of the Cassatt Memorial; The Meadows Division and Manhattan Transfer: Monograph by Edward B. Temple; The North River Division: Monograph by B. H. M. Hewett; Electric Traction and Station Construction: Condensed from George Gibbs' paper for American Society of Civil Engineers, by E. J. Bell; The Architectural Motif of the Pennsylvania Station, by W. Symmes Richardson; The East River Division: Monograph by James H. Brace; The Operation of the Railroad; The New York Connecting Railroad; The City of New York, by Joseph Caccavaio.

STRUCTURAL DESIGN.

Vol. I, Elements of Structural Design. By Horace R. Thayer, Assoc. M. Am. Soc. C. E. Cloth, 9½ x 6 in., illus., 7 + 221 pp. New York, D. Van Nostrand Company, 1912. \$2.00.

This volume, in which the author considers wooden structures and the fundamental principles of design in steel, as well as those of shop practice and erection,

is stated to be the first of three works on structural design. It is said that the book is intended for students and draftsmen with a knowledge of mechanics, stresses, and mathematics. Materials and their commercial shapes are first discussed. These chapters are followed by explanations of how companies are organized to handle such materials, and by descriptions of their machines, capacities, and methods of operation. Explanations of how a member carrying a given stress can be most economically fabricated to carry its load are then given, together with methods of fastening together these members, and the design of finished structures. The Chapter headings are: Materials; Commercial Shapes; Wooden Structures; Fabrication of Structural Steel; The Engineering Department; Index.

PRACTICAL METHODS OF SEWAGE DISPOSAL

For Residences, Hotels and Institutions. By Henry N. Ogden, M. Am. Soc. C. E., and H. Burdett Cleveland, Assoc. M. Am. Soc. C. E. Cloth, $9\frac{1}{2} \times 6$ in., illus., 6 + 132 pp. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1912. \$1.50.

The authors, it is stated, have had many inquiries on how to construct a septic tank and how to dispose of sewage from country houses, and in this book, they have tried to answer these queries in a non-technical way. Descriptions and explanations of the various methods of sewage disposal are given in such a way that it is hoped the householder will be able to build a sewage disposal plant that will operate effectively and without nuisance. The Chapter headings are: Introductory; The Settling Tank; Valves, Siphons, and Siphon Chambers; Sub-surface Irrigation; Sewage Filters; Broad Irrigation; Estimates of Cost; Index.

THE REGULATION OF MUNICIPAL UTILITIES.

Edited by Clyde Lyndon King. (National Municipal League Series.) Cloth, $7\frac{1}{2} \times 5$ in., 9 + 404 pp. New York and London, D. Appleton and Company, 1912. \$1.50.

Since the first meeting of the National Municipal League, in 1894, it is stated that the subject of public utility franchises has been considered at its meetings in numerous papers describing local conditions with comments on the lessons involved, the ways and means of handling the franchise problem in American cities, with propositions looking to its solution, together with various committee reports, etc. Most of these papers are out of print, and this book, embodying the more important ones, has been compiled, the subject-matter being brought up to date and supplemented with additional information and discussion by the editor. The volume has been prepared, it is stated, to aid in a clearer comprehension of the principles to be followed in the granting, control, and management of public utility franchises and the formation of a sound public policy in relation thereto. The Contents are: Introduction; The Need of Regulation; Municipal Ownership versus Adequate Regulation; The Minneapolis Gas Settlement, by Stiles P. Jones. Regulation Through Franchise: Franchise Essentials; The Sliding Scale Method of Regulation as Applied to Gas Companies in Massachusetts, by Edgar N. Wrightington; Is a Rational Basis Possible for Telephone Rates? by Dugald C. Jackson; A Rapid Transit Policy for Greater New York, by Milo R. Maltbie; Elements of a Constructive Franchise Policy, by Delos F. Wilcox; Suggestions for a Model Street Railway Franchise, by Delos F. Wilcox and James W. S. Peters; Regulation Through Municipal Utility Commissions; The Need of Public Utility Commissions; The Board of Public Utilities of Los Angeles, by Lewis R. Works; The Utilities Commission of Kansas City, Missouri, by Jacob A. Harzfeld; The St. Louis Public Service Commission, by Roger N. Baldwin. Regulation Through State Public Utility Commissions: State versus Municipal Utility Commissions; Uniform Accounting; Its Needs and Result, by Edwin H. Gruhl; The Public Utilities Commission of Massachusetts, by Joseph B. Eastman; The Wisconsin Public Utilities, by Balthasar H. Meyer; The Public Service Commissions of New York; In Conclusion; A Selected Bibliography; Index.

MOLDING CONCRETE FLOWER POTS, BOXES, JARDINIERS, ETC.

By A. A. Houghton. (Concrete Worker's Reference Books, No. 10.) Paper, $7\frac{1}{2} \times 5$ in., illus., 52 pp. New York, The Norman W. Henley Publishing Co., 1912. 50 cents.

In a secondary title it is stated that this book is a practical treatise explanatory of the construction of various designs of concrete flower pots, jardinières, and window boxes of concrete for the house and porch, together with detailed instructions as to the reinforcement, the construction of various kinds of moulds, cores, and the methods of ornamental surface treatments of the casts after moulding. The Contents are: Proportioning and Mixing the Concrete for the Work; Construc-

tion of the Molds; Construction of the Cores; Plaster and Composition Molds; Wood and Sheet-Metal Molds; Glue, Sand, and Wax Molds; Reinforcing the Work; Removing the Work from the Mold; Flower-Pot Molds; Flower Boxes of Concrete; Cardboard Models for Ornamental Work; Inlaid Ornamentation; Cutting Ornamental Designs Upon Work; Finishing the Surface of Your Work; Index.

MOLDING CONCRETE FOUNTAINS AND LAWN ORNAMENTS.

By A. A. Houghton. (Concrete Worker's Reference Books, No. 11.) Paper, $7\frac{1}{2} \times 5$ in., illus., 56 pp. New York, The Norman W. Henley Publishing Co., 1912. 50 cents.

In this volume the author describes and explains in detail the construction of moulds for, and the methods of moulding various styles of concrete fountains, lawn seats, curbing, hitching posts, pergolas, sun dials, lawn vases, and other ornamental garden furniture of concrete. The Contents are: Concrete Employed for Lawn Ornaments; Preventing the Concrete from Adhering to Mold; Molding Concrete Fountains; Constructing an Attractive Base for a Fountain; The Plaster System of Molding Concrete Fountains; Molding Concrete Lawn-Benches and Seats; Molding Concrete Curbing; Constructing Concrete Pergolas; Molding Concrete Sun-Dials; Concrete Lawn Vases and Urns; Molding Concrete Hitching-Posts; Finishing the Surface of the Work.

MECHANICS OF HEATING AND VENTILATING

With Charts for Calculation and Examples. By Konrad Meier. Cloth, $9\frac{1}{2} \times 6\frac{1}{2}$ in., illus., 9 + 161 pp. New York and London, The McGraw-Hill Book Company, 1912. \$5.00.

The subject-matter of this volume, which relates only to the movement of fluids, is presented, it is stated, as data collected from various sources. These data have been selected, it is said, to meet certain needs and have been arranged so as to be readily applicable to such needs. The aim has been to present a comprehensive and explanatory outline of the subject and to make the data more useful to the engineer and student. To this end ten charts have been prepared and are published with the text, which give, it is stated, special data for balancing gravity hot-water heating systems and the principal factors for correction, as well as means for rapid approximation and for quick reading of the simple relations of area, speed, and quantity. The Contents are: Introduction; The Flow of Water; Theory of the Flow; Forced Hot Water Heating; Hot Water Heating by Gravity; The Flow of Steam; Theory of the Flow; High-Pressure Steam Distribution; Low-Pressure Steam Distribution. The Flow of Air; Theory of the Flow; Air Blast at High Velocities; Forced Ventilation; Hot Air Heating and Ventilating by Gravity.

THE EFFECTS OF ERRORS IN SURVEYING.

By Henry Briggs. Cloth, $8 \times 5\frac{1}{2}$ in., illus., 11 + 179 pp. London, Charles Griffin and Company, Limited; Philadelphia, J. B. Lippincott Company, 1912.

This work is stated to form a contribution to the study of the propagation of error in surveys, the author's purpose being to investigate how errors combine in affecting the accuracy of surveys, and from the results of such investigation to frame rules to help the surveyor to guard against error and to devise methods that will allow him to assess the error likely to occur in any given case in practice. The criterion used throughout the book is said to be the "average error," the reason for its use being explained in Chapter II. The book, it is stated, is intended chiefly for surveyors whose practical experience will enable them to make the fullest use of the methods of analysis developed, and in order to render the work more useful to civil and mining engineers every-day practice with small instruments is dealt with rather than geodetic surveying. Owing to the diversity of mine-surveying problems, the author has used them frequently as examples for discussion. The Contents are: Introduction; The Analysis of Error; The Best Shape of Triangles; The Propagation of Error in Traversing; The Application of the Methods of Determining Average Error to Certain Problems in Traversing; the Propagation of Error in Minor Triangulation; Summary of Results; Appendix; Table I, Square Roots, Squares, Reciprocals, and Squares of Reciprocals of Numbers; Table II Conversion Tables, Seconds and Radians; Table III, Odds in Favor of an Error being Less than \pm Times the Average Error; Index.

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BY PURCHASE

Die Eisenbahn-Technik der Gegenwart unter Mitwirkung angesehenen Eisenbahn-Fachleute. Herausgegeben von Blum von Borries und Barkhausen. Band 2: Der Eisenbahnbau. C. W. Kreidel's Verlag, Wiesbaden, 1906.

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Forscherarbeiten auf dem Gebiete des Eisenbetons: Über Neuere Versuche mit Umschnürtem und Ringbewehrtem Beton. Von A. Kleinogel. Wilhelm Ernst & Sohn, Berlin, 1912.

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Text Book of Cyanide Practice. By H. W. MacFarren. McGraw-Hill Book Company, New York and London, 1912.

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SUMMARY OF ACCESSIONS

(From May 3d to August 1st, 1912)

Donations (including 156 duplicates).....	979
By purchase.....	63
Total.....	1 042

MEMBERSHIP

ADDITIONS

(From May 4th to August 1st, 1912)

MEMBERS		Date of Membership.
ADAMS, RAYMOND EDMOND. Civ. Engr., War Dept. (Res., 808 Taylor St., N. W.), Washington, D. C.	Jun.	May 1, 1900
	Assoc. M.	Dec. 6, 1905
	M.	May 28, 1912
ADGATE, FREDERICK WHITNEY. Western Mgr., The Foundation Co., 640 The Rookery, Chicago, Ill.	Assoc. M.	Jan. 6, 1904
	M.	May 28, 1912
ALTSTAETTER, FREDERICK WILLIAM. Maj., Corps of Engrs., U. S. A., P. O. Box 75, Wheeling, W. Va.	Assoc. M.	Nov. 6, 1907
	M.	May 28, 1912
ANTIBUS, ROY. With Northern Ohio Power Co., 350 South Main St., Mansfield, Ohio		April 30, 1912
BALDWIN, WILLIAM JAMES, JR. Cons. Engr., 1181 Broad- way, New York City		April 30, 1912
BALSLEY, EUGENE ALBERT. Mgr., Am. Plant, Am. Bridge Co., 40th St. and Princeton Ave., Chicago, Ill.		April 30, 1912
BOGEN, LOUIS EDWARD. Chf. Estimating Engr., The Allis-Chalmers Co. (Res., 171 Twenty-first St.), Milwaukee, Wis.	Jun.	April 30, 1895
	Assoc. M.	June 4, 1902
	M.	July 9, 1912
BONSTOW, THOMAS LACEY. With S. Pearson & Son, Ciudad Camargo, Chihuahua, Mexico		Feb. 6, 1912
BOWEN, SHERMAN WORCESTER. Prin. Asst. Engr., Brenneke & Fay, 5945 Cote Brillante Ave., St. Louis, Mo.	Assoc. M.	Sept. 7, 1904
	M.	July 9, 1912
BRUSH, WILLIAM WHITLOCK. Deputy Chf. Engr., Dept. of Water Supply, Gas and Electricity, 21 Park Row, New York City	Jun.	Mar. 3, 1896
	Assoc. M.	April 5, 1905
	M.	May 28, 1912
BYERS, CHARLES HOPKINS. Asst. Engr., C., M. & P. S. Ry., 617 White Bldg., Seattle, Wash.		July 9, 1912
COTTMAN, LEWIS WARRINGTON. Supt. and Chf. Engr., The Palmetto Phosphate Co., P. O. Box 782, Balti- more, Md.		April 30, 1912
FRYE, HARLEY EDGAR. Junior Engr., U. S. Engr. Corps, U. S. Engr. Office, Zanes- ville, Ohio	Assoc. M.	June 1, 1909
	M.	July 9, 1912
GARTENSTEIG, CHARLES. Engr. of Design, Office of Pres., Borough of the Bronx, 177th St. and 3d Ave. (Res., 30 West 85th St.), New York City	Jun.	Oct. 6, 1896
	Assoc. M.	May 6, 1903
	M.	April 30, 1912
GILES, JOHN ANGUS. City Engr., Municipal Bldg. (Res., 72 Davis St.), Binghamton, N. Y.		July 9, 1912

MEMBERS (*Continued*)

		Date of Membership.
GIRAND, JAMES BELL. Territorial Engr. of Arizona, 301 Fleming Blk., Phoenix, Ariz.		July 9, 1912
GREENE, FREDERICK STUART. Vice-Pres. and Gen. Mgr., The Waterproofing Co., 150 East 36th St., New York City.....	Assoc. M. M.	June 7, 1899 May 28, 1912
HARRISON, WILLIAM BURR. Asst. Engr., U. S. Engr. Dept. at Large, 920 Seventeenth St., N. W., Washington, D. C.		April 30, 1912
HASLEY, THOMAS RICHARD. Menominee, Mich.		Jan. 2, 1912
HUBBARD, FRANK RICHARDS. 625 Flynn Blk., Des Moines, Iowa.		April 30, 1912
JANNEY, THOMAS GORDON. Cons. Engr., Leesburg, Va.	Assoc. M. M.	Oct. 3, 1900 May 28, 1912
JOHN, GRIFFITH. Member, Board of Cons. Engrs., Otis Elevator Co., 17 Battery Pl., New York City (Res., 11 Delevan Terrace, Yonkers, N. Y.)		April 30, 1912
JOHNSTON, CHARLES EUGENE. Chf. Engr., Kansas City South. Ry., Kansas City, Mo.	Assoc. M. M.	June 1, 1909 July 9, 1912
KEMP, JOHN EDWARD. Civ. Engr., Kewanee Works, National Tube Co., Kewanee Ill.	Assoc. M. M.	April 1, 1908 May 28, 1912
KIMBALL, CHARLES SEYMOUR. Engr. of Way, Washington Ry. & Elec. Co., 14th and East Capitol Streets, Washington, D. C.		July 9, 1912
LARNER, CHESTER WATERS. Hydr. Engr., Wellman-Seaver-Morgan Co., Cleveland, Ohio.....		April 30, 1912
LENTH, GEORGE CASPER DOERING. Engr., Board of Local Impvts, 3917 North 42d Ave., Chicago, Ill.....		July 9, 1912
LOUCKES, FRANK IRWIN. U. S. Junior Engr., U. S. Engr. Office, Box 72, Louisville, Ky.	Assoc. M. M.	Jan. 3, 1911 May 28, 1912
LUTZ, ULYSSES STANISLAUS. Asst. Engr., Dept. of Finance, New York City, 1760 West 8th St., Brooklyn, N. Y.		Mar. 5, 1912
MACLAY, EDGAR GLEIM. Chf. Engr., The Am. Constr. Co., 915 Carter Bldg., Houston, Tex.	Assoc. M. M.	Oct. 3, 1906 July 9, 1912
MCCONNELL, JOHN LORENZO. Supt. and Constr. Engr., Holabird & Roche, 1514 East 54th St., Chicago, Ill.....	Jun. Assoc. M. M.	April 4, 1905 Jan. 2, 1907 April 2, 1912
MCCURDY, HARRY SHERWOOD ROYDEN. Div. Engr., Board of Water Supply, City of New York, Brown Station, N. Y.	Assoc. M. M.	Sept. 7, 1904 April 30, 1912
MADELEY, JAMES WELBY, Special Engr., Corporation of Madras, Madras, India.....		May 28, 1912

MEMBERS (*Continued*)Date of
Membership.

MORRISSEY, JAMES PAUL. Div. Engr., New York State Highway Dept., 423 Cutler Bldg., Rochester (Res., 30 West 4th St., Dunkirk), N. Y.		May 28, 1912
MORSE, CHARLES FRANCIS. Sec. Engr., Board of Water Supply of the City of New York, Wallkill, N. Y.		May 28, 1912
MOWER, HARRISON CURTIS. U. S. Engr. Office, Tuscaloosa, Ala.		July 9, 1912
NEVILLE, COLONE WILL JACKSON. Contr. Engr., 1020 Maison Blanche Bldg., New Orleans, La.	Jun. Oct. 1, 1901 Assoc. M. June 3, 1903 M. July 9, 1912	
NIMMO, JAMES VALENCE. Div. Engr., C. N. P. Ry., Lytton, B. C., Canada.	Assoc. M. Sept. 5, 1906 M. April 30, 1912	
OSBORNE, HENRY ZENAS, JR. Office Engr., City Engr.'s Office, Los Angeles, Cal.		July 9, 1912
PEIRCE, VERNON MARSHALL. Chf. Engr., Office of Public Rds., U. S. Dept. of Agri., Washington, D. C.		April 30, 1912
ROCKWELL, EDWARD HENRY. Prof. of Structural Eng., Tufts Coll., Tufts College, Mass.	Assoc. M. June 1, 1909 M. May 28, 1912	
ROSS, JAMES GEORGE. U. S. Asst. Engr., Box 1017, Memphis, Tenn.		May 28, 1912
RUMERY, RALPH ROLLINS. Cons. Engr., 50 Church St., New York City.		April 30, 1912
SENIOR, SAMUEL PALMER. Engr. and Gen. Mgr., Bridgeport Hydr. Co., 820 Main St. (Res., 2121 North Ave.), Bridgeport, Conn.	Assoc. M. Oct. 7, 1902 M. May 28, 1912	
SKELLY, JAMES WILLIAM. U. S. Asst. Engr., U. S. Engr. Office, Custom House, St. Louis, Mo.	Jun. May 2, 1899 Assoc. M. April 1, 1903 M. April 30, 1912	
SMITH, LLOYD BOWN. Chf. Engr. and Vice-Pres., The Topeka Bridge & Iron Co., 13th and Jefferson Streets, Topeka, Kans.	Assoc. M. April 6, 1904 M. July 9, 1912	
STEIN, CHARLES HENRY. Engr., M. of W., C. R. R. of N. J., 185 Arlington Ave., Jersey City, N. J.		July 9, 1912
STEVENS, JOHN CYPRIAN. Engr., Ebro Irrig. & Power Co., Apartado 491, Barcelona, Spain.	Assoc. M. April 1, 1908 M. May 28, 1912	
SWINDLEHURST, HAROLD LIONEL. Shire Engr., Mulwaree, Goulburn City, New South Wales, Australia.		Feb. 6, 1912
TAGGART, RALPH CONE. Cons. Engr., Associated with William J. Baldwin, World Bldg., New York City.	Assoc. M. Oct. 5, 1904 M. July 9, 1912	
WEATHERLY, EVERETT PINE. Div. Engr., Kansas City Terminal Ry., 23d St. and Grand Ave., Kansas City, Mo.		April 30, 1912

MEMBERS (*Continued*)

		Date of Membership.
WELLER, FRANCIS REPETTI. Civ. and Hydr. Engr., 405 Hibbs Bldg., Washington, D. C.	{ Jun. Assoc. M. M.	Feb. 5, 1901 Nov. 1, 1905 April 30, 1912
WILLIAMS, FRANK MARTIN. Chf. Engr., Coleman du Pont Rd., Goshen, N. Y.		May 28, 1912

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ALLEN, MAYNARD EDWARD. Contr. Engr., Central States Bridge Co., 601 Beecher St., Indianapolis, Ind.		April 30, 1912
ANDREWS, JAMES HENRY MILLAR. Engr. of Distrib., Philadelphia Rap. Trans. Co., 820 Dauphin St., Philadelphia, Pa.		April 2, 1912
AYRES, ROWAN. Supt. of Constr., Cia. Constructora de Ferrocarriles, Apartado 27, Patzcuaro, Michoacan, Mexico.		July 9, 1912
BALL, EDGAR E. Engr. of Constr., A., T. & S. F. Ry., Winslow, Ariz.		July 9, 1912
BARFOED, SVEND. 1211 First National Bank Bldg., San Francisco, Cal.		April 2, 1912
BARSHELL, FREDERICK BAYARD. Asst. Engr., Public Service Comm., First Dist., State of New York, Room 2002, Tribune Bldg., New York City.	{ Jun. Assoc. M.	May 1, 1906 April 30, 1912
BARTHOLOMEES, CHARLES FELIX. Chf. Draftsman, Kansas City Water Dept., 4338 Locust St., Kansas City, Mo.		May 28, 1912
BECKER, RUDOLPH CONRAD. 339 East 68th St., New York City.	{ Jun. Assoc. M.	April 30, 1907 May 28, 1912
BELLAMY, HERBERT ERNEST. Res. Engr., Southern & Western Ocean Sewer Works, Public Works Dept., Sydney, New South Wales, Australia.		Oct. 3, 1911
BIRDSEYE, CLAUDE HALE. Topographer in Chg., Hawaiian Islands, U. S. Geological Survey, Washington, D. C.		April 30, 1912
BOGERT, CLINTON LATHROP. Asst. Engr., Headquarters Dept., Board of Water Supply, 165 Broadway, Room 725, New York City.	{ Jun. Assoc. M.	Sept. 1, 1908 May 28, 1912
BRIGHT, JOSEPH SHIRLEY. County Surv., San Bernardino Co., Box 627, San Bernardino, Cal.		May 28, 1912
BRUA, ELMER GEORGE. Mgr., Tax and Right of Way Dept., Associated Oil Co., 422 Wells Fargo Bldg., San Francisco, Cal.	{ Jun. Assoc. M.	Feb. 6, 1906 April 30, 1912
BURGESS, EZRA OTTLEY. Secy. and Treas., Berkeley Steel Co., 2115 Center St., Berkeley, Cal.		April 30, 1912

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BURKETT, JOSEPH MILLER. Carey Act Engr., State of Idaho, Twin Falls, Idaho.....		May 28, 1912
CHESTER, CHARLES PORTER. With Stone & Webster Eng. Corporation, Fort Worth, Tex. {	Jun. Assoc. M.	Feb. 4, 1908 April 30, 1912
CHEVALIER, WILLARD TOWNSHEND. Care, Atlantic, Gulf & Pacific Co., Comstock, N. Y. {	Jun. Assoc. M.	April 6, 1909 April 30, 1912
CLOUGH, ALBERT HASKELL. Care, South San Joaquin Irrig. Canal, Oakdale, Cal.		May 28, 1912
CLYDE, RAY WEDGEWOOD. Care, Central Aguirre Sugar Co., Central Aguirre, Porto Rico		April 30, 1912
COFFIN, THEODORE DELONG. Katonah, N. Y... {	Jun. Assoc. M.	Nov. 1, 1904 May 28, 1912
COOKE, MORTIMER MORDECAI. Chf. Engr., The Wichita Falls Route, Wichita Falls, Tex.....		April 30, 1912
COOPER, PERCY GORDON. Draftsman, Bureau of Yards and Docks, Navy Dept., 510 Mills Bldg., Washington, D. C.		July 9, 1912
COSCULLUELA Y BARRERAS, JUAN ANTONIO. Second Chf. Engr., Province of Havana, and Cons. Engr. of Comunidad de Regantes de Guines, San Miguel 105, Havana, Cuba.....		April 30, 1912
CRONHOLM, FREDERICK N. With U. S. Reclamation Service, Rupert, Idaho		July 9, 1912
CURTIS, JAMES EUGENE. Junior Engr., U. S. Engr. Office, Filtration Plant, Washington, D. C.....		April 30, 1912
DAHL, STEN TAGE. Asst. Engr., Eugene W. Stern, 253 West 93d St., New York City.....		April 30, 1912
DIXON, GEORGE GALE. 1120 Tremont Bldg., Boston, Mass.		July 9, 1912
DOBBINS, JOHN LESLIE. Cons. Engr.; Prof. of Ry. Eng., Imperial Pei Yang Univ., Tientsin, China.....		May 28, 1912
EHRSAM, FRITZ. 375 East 199th St., New York City....		July 9, 1912
ELLIS, LAWRENCE REES. Engr. and Contr., 613 Am. Bank Bldg., Seattle, Wash.....		April 30, 1912
FEGLES, DONALD BARRY. Care, Hewitt & Brown, 716 Fourth Ave., South, Minneapolis, Minn.....		May 28, 1912
FISHER, FREDERICK WILLIAM. Field Engr., Rochester Ry. & Light Co., 34 Clinton Ave., N., Rochester, N. Y..		July 9, 1912
FLEMING, BURTON PERCIVAL. Head, Dept. of Mech. Eng., State Univ. of Iowa, Iowa City, Iowa.....		May 28, 1912
FOX, CHARLES KIRBY. Chf. Engr., Modoc County Irrig. Co., Ft. Bidwell, Cal.....		May 28, 1912
FRENCH, CARSON GEYER. 1825 Commercial National Bank Bldg., Chicago, Ill.....		May 28, 1912

ASSOCIATE MEMBERS (*Continued*)Date of
Membership.

FRENCH, HALSEY. Asst. Engr.-Designer, Board of Water Supply, 165 Broadway, Room 725, New York City (Res., 612 East 15th St., Brooklyn, N. Y.)	July 9, 1912
GERWICK, BEN CLIFFORD. Care, State Highway Comm., San Luis Obispo, Cal.	May 28, 1912
GINSBURG, SAMUEL ROLAND. Prin. Asst. Engr., Central Romana, La Romana, Santo Domingo	May 28, 1912
GRIFFIN, AUGUSTUS. Engr., Modesto Irrig. Dist., Modesto, Cal.	Jun. Oct. 30, 1906
GRIFFIN, JOHN ALDEN. Cons. and Designing Civ.-Hydr. Engr., 428 East 52d St., Los Angeles, Cal.	May 28, 1912
HALL, JOSEPH EMMETT. Pres., J. E. Hall & Co., 427 Board of Trade Bldg., Indianapolis, Ind.	Jun. June 30, 1910
HANNA, WILBUR SHERFEY. Asst. Engr., U. S. Indian Irrig. Service, Harlem, Mont.	Assoc. M. May 28, 1912
HARDONCOURT, ARTHUR, JR. Designing Engr., National Fireproofing Co., P. O. Box 71, Station L, Brooklyn, N. Y.	July 9, 1912
HICKOK, CLIFTON EWING. Res. Engr. for Smith, Kerry & Chace, Bull Run, Ore.	April 30, 1912
HILDER, FRAZER CROSWELL. Eng. and Architectural Draftsman, Office of Indian Affairs, Washington, D. C.	Dec. 6, 1910
HILL, PHILIP BROCKETT. Cons. Engr. (Lund & Hill), 201½ West 2d St., Little Rock, Ark.	May 28, 1912
HILTON, HORACE ALDEN. Asst. Engr., Maine Cent. R. R., 25 Bolton St., Portland, Me.	Jun. Sept. 6, 1904
HOGLUND, CARL AUGUST. Res. Engr., Kansas City Terminal Ry., 25 West 38th St., Kansas City, Mo.	Assoc. M. April 30, 1912
HOLMES, HOWARD WHITTIER. 434 Harrison St., Portland, Ore.	May 28, 1912
HOVENDEN, THOMAS. Gen. Supt., W. W. Lindsay & Co., 902 Harrison Bldg., Philadelphia, Pa.	May 28, 1912
HOWARD, ROBERT CHESTER. Tyler, Fla.	July 9, 1912
HOWSON, ELMER THOMAS. Civ. Eng. Editor, <i>Railway Age Gazette</i> , 417 South Dearborn St., Room 402, Chicago, Ill.	May 28, 1912
HURD, HARRY LUTHER. Asst. Engr., Board of Water Supply of the City of New York, 12 Oakwood Ave., White Plains, N. Y.	May 28, 1912
JONES, JOSEPH WARREN. Res. Engr., The Phenix Iron Co. and The Phenix Bridge Co., 528 Pierce Bldg., St. Louis, Mo.	Jan. 2, 1912

ASSOCIATE MEMBERS (*Continued*)Date of
Membership.

JONES, PUSEY. Care, Georgia Coast & Piedmont R. R., 30 Broad St., Room 309, New York City.....	{ Jun. Mar. 6, 1906 Assoc. M. April 30, 1912
KASSEBAUM, FREDERICK WILLIAM, JR. Asst. Engr., Chicago Harbor and Subway Comm., City Hall Sq. Bldg., Chicago, Ill.....	April 2, 1912
KENNEDY, PATRICK JAMES. Contr. Engr., 464 Maple St., Holyoke, Mass.....	May 28, 1912
KERSHAW, WILLIAM HENRY. Chf. Engr., Paving and Roads Div., The Texas Co., 17 Battery Pl., New York City (Res., 433 Golden Hill St., Bridgeport, Conn.).....	May 28, 1912
KINGSLEY, GEORGE. Asst. Engr. with William J. Wilgus (Res., 960 Fox St.), New York City.....	{ Jun. June 2, 1908 Assoc. M. April 30, 1912
KNIGHT, WALTER JOSEPH. Chf. Engr., Gilsonite Constr. Co., 720 Wainwright Bldg., St. Louis, Mo.....	{ Jun. May 5, 1908 Assoc. M. May 28, 1912
LAWRIE, JAMES MUIR. Care, Trussed Concrete Steel Co., Ltd., Caxton House, Westminster, S. W., London, England.	May 28, 1912
LESER, HENRY. Asst. Engr., I. R. T. Co., 32 Park Pl., New York City.....	July 9, 1912
LEVY, AARON GRETZNER. Asst. Director, New Orleans Purification Plants, P. O. Box 791, Station B, New Orleans, La.....	July 9, 1912
LIEBERMAN, ERNST. (Lieberman & Klein), 79 West Monroe St., Room 1204, Chicago, Ill.....	April 30, 1912
LUND, ALFRED MAJENDIE. Cons. Engr. (Lund & Hill), 202½ West 2d St., Little Rock, Ark.....	April 30, 1912
LYONS, HAROLD CHANDOS. Prin. Asst. Engr., Construction Service Co., 15 William St., New York City.....	July 9, 1912
MCLEOD, DONALD FRASER. City Engr., 318 North Aurora St., Ithaca, N. Y.....	April 30, 1912
MAZEAU, CAMILLE. Asst. Engr., Dept. of Bridges, City of New York, 179 Washington St., Brooklyn, N. Y....	May 28, 1912
MERRILL, ROBERT HALL. Asst. Engr., Barge Canal Office, 527 West Center St., Medina, N. Y.....	{ Jun. May 3, 1904 Assoc. M. May 28, 1912
MOFFATT, BURNAM A. Pres., Cook Constr. Co., 809 Observatory Bldg., Des Moines, Iowa.....	April 30, 1912
MOLINA, VICENTE. Chf. Engr., United Railroads of Yucatan, Calle 63, No. 469, Merida, Yucatan, Mexico.	April 2, 1912
MORTON, ROBERT MILLER. Engr., Highway Comm. of San Joaquin County, San Joaquin Bldg., Stockton, Cal.	April 30, 1912

ASSOCIATE MEMBERS (<i>Continued</i>)		Date of Membership.
NEEDHAM, LAWRENCE KENNETH. Care, Chf. Engr., Spokane, Portland & Seattle Ry., Portland, Ore.....		April 2, 1912
OLSON, NORMAN T. Asst. Engr., U. S. Reclamation Service, Helena, Mont.....		May 28, 1912
PAGE, ARTHUR SOUTHWICK. 56 Burleigh St., Waterville, Me.		July 9, 1912
PALMER, CHARLES WALTER. Cons. Engr., 420 Perry Bldg., Philadelphia, Pa.....		April 2, 1912
PARLIN, RAYMOND WASHINGTON. Care, Am. W. W. & Guarantee Co., 345 Fourth Ave., Pittsburgh, Pa.....	} Jun. } Assoc. M.	June 30, 1910 April 2, 1912
PEASE, WILLIAM ELWOOD. 908 Williamson Bldg., Cleve- land, Ohio.....		July 9, 1912
PECK, CHARLES FRANKLIN. Structural Engr., } 1115 Oak St., Kalamazoo, Mich.....	} Jun. } Assoc. M.	April 2, 1907 April 30, 1912
PERRY, JOHN PRINCE HAZEN. Mgr., Contr. Dept., Turner Constr. Co., 11 Broadway, New York City.....	} Jun. } Assoc. M.	Nov. 1, 1904 May 28, 1912
PETTERSON, HAROLD AUS. Care, Northern Elec. Ry. Co., 310 Sansome St., San Francisco, Cal.....		May 28, 1912
PILL, LEON MORLEY. 1217 Tenth Ave., South, } Birmingham, Ala.....	} Jun. } Assoc. M.	Aug. 31, 1909 May 28, 1912
PIODA, ALBERT WOODBRIDGE. Supt., Granite Rock Co., Watsonville, Cal.....		Mar. 5, 1912
PRATT, WALLACE WILLIAMS. Asst. Engr., Farnham Dam, New Lenox, Mass.....		April 30, 1912
RANNEY, WILLIS. Res. Engr., The Medina Irrig. Co., Mico, Tex.		July 9, 1912
RASINSKY, CHARLES EZEKIEL. Civ. and Structural Engr., 303 Provident Bank Bldg., Cincinnati, Ohio.....		July 9, 1912
ROBINSON, ROBERT BRUCE. Asst. Engr., Ore. Short Line R. R., Rupert, Idaho.....		July 9, 1912
ROBSON, ROBERT HAVELOCK. Instrumentman and Cement Insp., Northern Contr. Co., Tallulah Falls, Ga.....		May 28, 1912
RONNEBERG, TRYGVE. Structural Engr., Willis Polk & Co., 1325 Merchants Exchange Bldg., San Francisco, Cal..		Mar. 5, 1912
ROSENTHAL, JOSEPH JACOB. Care, Const. Quartermaster, War Dept., U. S. Army, Fort Mills, Philippine Islands		April 30, 1912
ROYER, ROBERT STUART. Engr. (McGhee & Royer), Box 344, Roanoke, Va.....		Feb. 6, 1912
RUGGLES, ARTHUR VALENTINE. Asst. Engr., Dept. of Water Supply, Gas, and Electricity, 13 Park Row, New York City.....		April 30, 1912

ASSOCIATE MEMBERS (Continued)

	Date of Membership.
SEELYE, ELWYN EGGLESTON. Asst. Engr., Grand Central Terminal Impvts., 65 Park Ave., New York City....	April 30, 1912
SESSIONS, EDSON OLIVER. Cons. Engr. (Woodmansee, Davidson & Sessions, Inc.), 5022 Sheridan Rd., Chicago, Ill.	July 9, 1912
SHUMAN, LEIGH DELLO. U. S. Asst. Engr., U. S. Engr. Office, 815 Witherspoon Bldg., Philadelphia, Pa.....	April 30, 1912
SNELL, EDWARD BENIAH. Junior Engr., U. S. A., 24 High St., New Haven, Conn.....	Feb. 6, 1912
STONE, WILLIAM EDMUND. Superv. in Chg., Constr., Gatun Spillway, Gatun, Canal Zone, Panama.....	July 9, 1912
SYKES, JOHN WALLACE JONES. Asst. Engr., The Laclede Gas Light Co., 3417 Park Ave., St. Louis, Mo.....	April 30, 1912
TALBOT, FREDERIC WILLIAM. Asst. Engr., U. S. Reclamation Service, St. Ignatius, Mont.....	April 30, 1912
TAYLOR, CHESTER ANTRIM. 2350 Park Ave., Indianapolis, Ind.	July 9, 1912
THAYER, NATHANIEL AUGUSTINE. Structural Steel Designer, Board of Education, 422 West 119th St., New York City.....	Jun. April 5, 1910 Assoc. M. April 2, 1912
THOMPSON, GUSTAVUS WILLIAM. Engr., Trussed Concrete Steel Co., 72 Utica City National Bank Bldg., Utica N. Y.....	July 9, 1912
TINKER, CLIFFORD ALBION. Archt. and Engr., Box 205, Westfield, Mass.....	Jan. 2, 1912
TODD, OLIVER JULIAN. Chf. Hydrographer, Hetch Hetchy Water Supply, Groveland, Cal.	Jun. Aug. 31, 1909 Assoc. M. April 30, 1912
TOMLINSON, CARL PERKINS. Asst. Supt. of Constr., Stone & Webster Eng. Corporation, 20 Pike Blk., Bellingham, Wash.	July 9, 1912
TYRE, PHILIP SCOTT. Engr. in Chg., Drafting Room, Geo. F. Pawling & Co., 6505 Ellwood Ave., Oak Lane, Philadelphia, Pa.....	July 9, 1912
UPTON, JOSEPH. 109 Main St., Flushing, N. Y.	Jun. Nov. 1, 1909 Assoc. M. July 9, 1912
VERHAREN, ARTHUR WARD. Irrig. Engr., Helena, Mont....	July 9, 1912
WALLER, PERCY. Asst. Engr., New York State Dept. of Highways, 423 Cutler Bldg., Rochester, N. Y.....	April 30, 1912
WASHINGTON, WALTER OWEN. Civ. and Contr. Engr. (Whiteaker & Washington), 240 Moore Bldg., San Antonio, Tex.....	Feb. 6, 1912
WATTERS, GEORGE LAWRENCE. Hydr. Engr., L. V. R. R., South Bethlehem, Pa.....	April 30, 1912

ASSOCIATE MEMBERS (*Continued*)Date of
Membership.

WEBBER, WARD PERRY. Asst. Engr., U. S. Indian Service, Box 150, Wapato, Wash.....	May 28, 1912
WILKINSON, FREDERICK ALLEN. Mgr., Santiago Ice Co., and Cons. Engr., Compania Naviera, Santiago de Cuba, Cuba.....	July 9, 1912
WILLCOMB, GEORGE EDWARD. Chemist in Chg., Albany Filtration Works, 113 North Allen St., Albany, N. Y.....	<div style="display: inline-block; vertical-align: middle;"> } Jun. Oct. 30, 1906 } Assoc. M. April 30, 1912 </div>
WOOD, CHARLES HANCOCK. Bridge Designer, New York State Barge Canal, 29 South Main Ave., Albany, N. Y.....	May 28, 1912
WOODSON, LEROY. Chf. Engr. and Supt. Soco R. R., for Porvenir Sugar Co., San Pedro de Marcoris, Santo Domingo.	April 2, 1912
ZIMMERMAN, OSCAR AMBROSE. Asst. Engr., The Missouri Val. Bridge & Iron Co., 203 Elm St., Leavenworth, Kans.	July 9, 1912

ASSOCIATES

BYERS, BENJAMIN BUTLER FRANKLIN. Supt. of Constr., Lock and Dam No. 15, Ohio River, P. O. Box 381, New Martinsville, W. Va.....	May 28, 1912
FLETCHER, LEWIS IRVING. Care, H. M. Byllesby & Co., Rock Island, Tenn.....	Feb. 6, 1912
HENRY, SMITH TOMPKINS. Dist. Representative, <i>Engineering Record</i> , 1021 Schofield Bldg., Cleveland, Ohio.....	<div style="display: inline-block; vertical-align: middle;"> } Jun. Sept. 5, 1905 } Assoc. May 28, 1912 </div>
KENNEDY, THOMAS PATRICK BERCHMANS. Pres. and Supt., Kennedy Constr. Co., 534 Broad- way (Res., 138 Washington Ave.), Albany, N. Y.....	<div style="display: inline-block; vertical-align: middle;"> } Jun. May 5, 1908 } Assoc. May 28, 1912 </div>
MACKENZIE, KENNETH GERARD. Cons. Chemist, The Texas Co., Bayonne, N. J.....	May 28, 1912

JUNIORS

BANBROOK, HERRMANN. Care, U. S. Reclamation Service, Babb, Mont.....	April 30, 1912
BARNES, HENRY WILFRID. Asst. Engr., John Mowlem & Co., Ltd., 228 Bishopsgate, E. C., London, England.....	April 30, 1912
BROOK, ALEC EDWARD. 15 Roehampton Ave., North Toronto, Ont., Canada.....	Mar. 5, 1912
BUCHANAN, WALTER JOHN. Fairholm, Giffnock, Renfrew- shire, Scotland.....	April 30, 1912
CAPESTANY, ROGELIO LILO. Asst. Engr., Porto Rico Irrig. Service, Guayama, Porto Rico.....	Feb. 6, 1912

JUNIORS (<i>Continued</i>)		Date of Membership.
DALEE, WILLIAM AMON. Care, Des Moines Bridge & Iron Co., 806 Curry Bldg., Pittsburgh, Pa.....		April 30, 1912
DERRICK, JOHN RUSSELL. Instrumentman, M. of W., N. & W. Ry., 531 Raleigh St., Bluefield, W. Va.....		May 28, 1912
DIRATZOUYAN, JANIK KEVORK. Designing Engr., The Benham Eng. Co., 812 Am. National Bank Bldg., Oklahoma, Okla.....		May 28, 1912
ERICKSON, CHARLES EDWARD. Secy., Erickson Constr. Co., 611 New York Blk., Seattle, Wash.....		Feb. 6, 1912
FRANKLIN, PHILIP AUGUSTUS. 228 Arcade Annex, Seattle, Wash.		Jan. 2, 1912
FRANKLIN, WILLIAM HAWLEY. Engr., Franklin Eng. Co., 228 Arcade Annex, Seattle, Wash.....		Feb. 6, 1912
GOETHALS, GEORGE RODMAN. Asst. Engr., Panama Canal Defenses, Isthmian Canal Comm., Culebra, Canal Zone, Panama.....		July 9, 1912
HASKINS, JOHN CHRISTOPHER. Clarksville, Tenn.....		May 28, 1912
HEALY, RALPH FRANCIS. With Pittsburgh Steel Products Co., Singer Bldg., New York City.....		Oct. 31, 1911
HYER, CHARLES JACOB. 18 First National Bank Bldg., Tampa, Fla.....		July 9, 1912
ILLINGWORTH, GEORGE CORLISS. Asst. to Enrique Touceda, Broadway, Cor. Thacher St., Albany, N. Y.....		Jan. 2, 1912
JONES, CHARLES HYLAND. Res. Engr., Erie R. R., Laketon, Ind.		July 9, 1912
KNISKERN, LEWIS THAYER. 215 West 23d St., New York City.		Feb. 6, 1912
LAUGHLIN, HARMONY LEONIDAS. Office Engr., Southern Alberta Land Co., Medicine Hat, Alberta, Canada....		May 28, 1912
MACDONALD, CHARLES. Treas., Wulff Eng. Co., Bank Bldg., Tarrytown, N. Y.....		April 30, 1912
MAILEY, JOHN BRUCE. 215 West 23d St., New York City..		April 30, 1912
MORRISON, WILLIAM HARRISON, JR. Box 261, Fonda, N. Y.		May 28, 1912
OHRT, FREDERICK. Engr., Madeira-Mamoré R. R., Caixó 304, Porto Velho de San Antonio, Rio Madeira, Brazil.		Feb. 6, 1912
SCUDDER, CHARLES MORRISON. 2516 Hall Ave., Marinette, Wis.		May 28, 1912
SHEA, CHELIUS HAZEL. Chf. Draftsman, Morgan Eng. Co., 610 Goodwyn Inst. Bldg., Memphis, Tenn.....		April 2, 1912
STEARNS, FRED LEROY. 130 Sumac St., Wissahickon, Philadelphia, Pa.....		April 2, 1912
STUPP, JOHN GEORGE. Asst. Engr. in Chg., Detailing Dept., Stupp Bros. Bridge & Iron Co. (Res., 3667 Utah Pl.), St. Louis, Mo.....		April 30, 1912

JUNIORS (<i>Continued</i>)		Date of Membership.
SWICKARD, JAMES BLAINE. Knights Ferry, Cal.....		April 30, 1912
SWIGART, CLYDE ARTHUR. Care, Standard Oil Co., Div. B, Taft, Cal.....		April 30, 1912
TAYLOR, SENECA VERN. 303 South State St., Ann Arbor, Mich.		Mar. 5, 1912
TRIMPI, ALLAN LITTELL. Asst. Engr., Water Dept., 35 Stockton Pl., East Orange, N. J.....		April 30, 1912
TUCKER, HENRY LEWIS. Draftsman, Div. of Drafting and Design, City of Pittsburgh, 4520 Fillmore St., Pitts- burgh, Pa.....		July 9, 1912
WEITZNER, HENRY MITCHEL. 1687 Bathgate Ave., New York City.		May 28, 1912
WHITMORE, HAROLD CUSHING. Care, Power Constr. Co., Somerset Dam, Mountain Mills, Vt.....		April 30, 1912
WILLS, WILBUR SUMMERS. U. S. Surv., Neligh, Nebr....		April 30, 1912
WINN, HARRY STRONG. Engr. of Constr., St. Louis Sewer Dept., 3835a Connecticut Ave., St. Louis, Mo.....		July 9, 1912

CHANGES OF ADDRESS

MEMBERS

ADAM, ROBERT. Laburnum House, Byron Hill, Harrow-on-the-Hill, London, England.	
ALDEN, HERBERT CLARENDON. Asst. Engr., Bureau of Sewers, 1519 Williams- bridge Rd., New York City.	
ALLEN, HERMON CHARLES. Cons. Engr., The Tannatt-Allen Eng. Co., 114 S. Monroe St., Spokane, Wash.	
ANNAN, CHARLES LE ROY. 2129 Scudder St., St. Paul, Minn.	
ARTHUR, HOWARD ELMER. Hortonia Hotel, Brandon, Vt.	
BAIRD, SAMUEL POND. Contr., 315 West 9th Ave., Columbus, Ohio.	
BASINGER, JAMES GARNETT. 52 Broadway, New York City.	
BAUCUS, WILLIAM I. Obras Publicas, Santo Domingo, Santo Domingo.	
BELDEN, HARRY AUSTIN. Care, C. G. Young, Bankers Trust Bldg., New York City.	
BOND, PAUL STANLEY. Capt., Corps of Engrs., U. S. A., Fort Leavenworth, Kans.	
BOWSER, EDMUND HAMILTON. Supt., Timber Dept., Ill. Cent. R. R., 203 Rogers Bldg., Memphis, Tenn.	
BOYDEN, HARRY CHESTER. Res. Engr., California Highway Comm., Sacra- mento, Cal.	
BROWN, WENDELL PHILLIPS. Asst. Engr., Wilbur J. Watson & Co., 1328 Citizens Bldg., Cleveland, Ohio.	
BROWN, WILLIAM MAXWELL. Chf. Engr., Passaic Val. Sewerage Commrs., Room 819, Essex Bldg., Newark, N. J.	

MEMBERS (*Continued*)

- BURT, HENRY JACKSON. Chf. Engr., Holabird & Roche, 1400 Monroe Bldg., Chicago, Ill.
- CALLAGHAN, JOHN. Chf. Engr., Pacific Great Eastern Ry., Vancouver, B. C., Canada.
- CANTINE, EDWARD IKE. Engr. and Contr., 502 Railway Exchange, Portland, Ore.
- CARR, WALTER FRANK. 822 Waterloo St., Los Angeles, Cal.
- CARROLL, CHARLES JOSEPH. Care, J. G. White & Co., 43 Exchange Pl., New York City.
- COLE, HOWARD JUDSON. Const. Engr., Crane Bldg., Room 4, Montclair, N. J.
- CUNNINGHAM, JOSEPH HOOKER. Cons. Hydr. Engr., 219 Lumbermans Bldg., Portland, Ore.
- DEVIN, GEORGE. Care, Kansas City Terminal Co., Kansas City, Mo.
- EARLY, PERCY WALKER. Chf. Engr., Virginia-Carolina Ry., Abingdon, Va.
- EBER, JOHN WILLIAM. Gen. Supt., Toronto, H. & B. Ry., Hamilton, Ont., Canada.
- ELLIOTT, CHARLES GLEASON. 2112 F St., Washington, D. C.
- ESSELSTYN, HORACE HOVEY. Engr., Westinghouse, Church, Kerr & Co., 67 Kenilworth Ave., Detroit, Mich.
- EVANS, LOUIS HYDE. Chf. Engr., New Orleans Terminal Co., New Orleans, La.
- EWING, WILLIAM WALLACE. Engr., Westinghouse, Church, Kerr & Co., Metropolitan Bldg., Vancouver, B. C., Canada.
- FESSENDEN, RALPH SETH. Chf. Engr., Twin Falls-Raft River Land & Water Co., Mountain Home, Idaho.
- FORD, WILLIAM GRIFFING. Cons. Engr., 55 Liberty St., New York City.
- FRENCH, JAMES ADAMS. State Engr., Santa Fe, N. Mex.
- FREW, ARCHIBALD SMITH. Bank of Australasia Chambers, Townsville, North Queensland, Australia.
- HALL, HENRY ARTHUR. Box 504, R. F. D. 4, Tacoma, Wash.
- HAMMOND, CHARLES LINCOLN. 41 Lincoln St., Malden, Mass.
- HARBY, ISAAC. 223 Lefferts Ave., Richmond Hill, N. Y.
- HASTINGS, FRANK ARNOLD. Structural and Cons. Engr., 515 Schmulbach Bldg., Wheeling, W. Va.
- HAYDEN, JOHN BRUCE. Care, Jobson-Gifford Co., 25 East 26th St., New York City.
- HEALD, EDWARD CRESWELL. With J. Henry Miller, Inc., 106 Dover St., Baltimore, Md.
- HECKLE, GEORGE ROGERS. Care, Ambursen Hydr. Constr. Co. of Canada, Ltd., 822 New Birks Bldg., Montreal, Que., Canada.
- HENNY, DAVID CHRISTIAAN. Cons. Hydr. Engr., 1005 Spalding Bldg., Portland, Ore.
- HEPBURN, FREDERICK TAYLOR. Banker (H. D. Walbridge & Co.), 14 Wall St., New York City.
- HERMANN, EDWARD ADOLPH. Pres., Reliance Quarry & Constr. Co., Room 7, Y. M. C. A., Alton, Ill.

MEMBERS (*Continued*)

- HILL, HARRY CYRUS. Engr., Lane Constr. Co., Meriden, Conn.
- HILL, LOUIS CLARENCE. 307 Wright and Callender Bldg., Los Angeles, Cal.
- HODGDON, FRANK WELLINGTON. Chf. Engr., Directors of the Port of Boston, 40 Central St., Boston, Mass.
- HOWE, WILSON TYLER. 21 Emery St., Tufts College, Mass.
- HUGGINS, WILLIAM. Care, South American Ry. Constr. Co., Ltd., Fortaleza, Ceara, Brazil.
- JAQUES, WILLIAM HENRY. Counselling Engr.; Pres., Hampton Water-Works Co., Little Boar's Head, N. H.
- JOHNSON, BEN. (Johnson & Co.), Miami, Fla.
- JOHNSON, CHAPMAN LOVE. Cons. Engr., Casanova, Va.
- JOHNSTON, JOHN ALBERT. Div. Engr., Massachusetts Highway Comm., 137½ State St., Springfield, Mass.
- KIMBALL, HERBERT SAWYER. Mill Archt. and Engr., 111 Devonshire St., Boston, Mass.
- KINNEAR, WILSON SHERMAN. Care, U. S. Realty & Impvt. Co., 111 Broadway, New York City.
- LAUIS, FRED. Care, Mendel y Cia., 383 Bartolome Mitre, Buenos Aires, Argentine Republic.
- LEA, RICHARD SMITH. Cons. Engr., Room 822, New Birks Bldg., Montreal, Que., Canada.
- LEBARON, JOHN FRANCIS. Cons. Engr., Castle Neck, Ipswich, Mass.
- LEWIS, CLARENCE CHARLES. Care, Cia. de Luz y Fuerza, Cordoba, Argentine Republic.
- LINDENTHAL, GUSTAV. Cons. Engr., 68 William St., New York City.
- LOCKWOOD, WILLARD DATUS. Santo Domingo, Santo Domingo.
- LUCAS, EUGENE WILLETT VAN COURT. Cons. Engr., 280 Broadway, Room 161, New York City.
- MACHEN, HENRY BENNETT. Borough Engr., Dept., Water Supply, Gas and Electricity, 13 Park Row, New York City.
- MCCARTHY, GEORGE ARNOLD. Care, Smith, Kerry & Chace, 603 Idaho Bldg., Boise, Idaho.
- MCGILVRAY, THOMAS FORRESTER. (The Duluth Eng. Co.), 613 Palladio Bldg., Duluth, Minn.
- MCREYNOLDS, ORVAL OMAR. Cons. Civ. and Min. Engr., R. F. D. No. 3, Porterville, Cal.
- MALTBY, FRANK BIERCE. Care, John F. Stevens Constr. Co., 55 Wall St., New York City.
- MARTIN, EDGAR DARWIN. 104 South Michigan Ave., Chicago, Ill.
- MAURICE, GEORGE HOLBROOKE. Eagle Springs, N. C.
- MAYER, JOSEPH. Prin. Asst. Engr., Quebec Bridge Comm., New Birks Bldg., Montreal, Que., Canada.
- MILLER, FRANK. Cons. Engr. (Long & Miller), 172 Fulton St., New York City.
- MINOR, EDWARD EASTMAN. Supt., New Haven Water Co., 167 Maple St., New Haven, Conn.

MEMBERS (*Continued*)

- MODJESKI, RALPH. Cons. Engr., 220 South Michigan Ave., Suite 750, Chicago, Ill.
- MORRISON, HARRY JOHNSON. Hineckley, N. Y.
- NICHOLS, EDWIN JAY. Asst. Engr., St. Louis Southwestern Ry., Tyler, Tex.
- PAGET, EDMUND WINTER. Apartment No. 26, The Fordham, Portland, Ore.
- PARKER, WILLIAM POOL. Cons. Engr. (Concrete-Steel Eng. Co.), 822 Park Row Bldg., New York City.
- PATRICK, MASON MATHEWS. Lt.-Col., Corps of Engrs., U. S. A., The Federal Bldg., Detroit, Mich.
- PHILLIPS, HIRAM. Cons. Hydr. and San. Engr., 420 Liggett Bldg., St. Louis, Mo.
- POST, HENRY WILLIS. P. O. Box 415, Mountain Lakes, Boonton, N. J.
- QUILTY, THOMAS FRANK. (John J. O'Heron & Co.), 218 Hearst Bldg., Chicago (Res., 419 South 64th Ave., Oak Park), Ill.
- RHINES, GEORGE VOLNEY. Archt. (Mills, Rhines, Bellman & Nordhoff), 1234 Ohio Bldg., Toledo, Ohio.
- RICKEY, JAMES WALTER. Chf. Engr., Long Sault Development Co., 2402 Oliver Bldg., Pittsburgh, Pa.
- RIPLEY, HERBERT LAWRENCE. Engr., Holbrook, Cabot & Rollins Corporation, Hinsdale, N. H.
- ROGERS, GEORGE HAMILTON. (Rogers & Latimer), 1133 Broadway, New York City.
- ROWSE, ALBERT OWEN. Asst. U. S. Engr., Gasconade, Mo.
- RUFFIN, CHARLES LORRAINE. Vice-Pres., Richmond & Rappahannock River Ry., Richmond, Va.
- RUST, CHARLES HENRY. City Engr.'s Dept., City Hall, Victoria, B. C., Canada.
- SAVILLE, CALEB MILLS. Chf. Engr., Board of Water Commrs., 701 Pilgurd Bldg., Hartford, Conn.
- SEUROT, PAUL ALBERT. Chf. Engr., Jacobs & Davies, Inc., Eastern Townships Bank Bldg., Montreal, Que., Canada.
- SHANKS, OSCAR. 10007 Longwood Boulevard, Chicago, Ill.
- SHERMAN, EDWARD CLAYTON. Cons. Engr., 6 Beacon St., Boston, Mass.
- SHERMAN, LEROY KEMPTON. Engr. and Contr., 3046 West 36th St. (Res., 6418 Sangamon St.), Chicago, Ill.
- STAYTON, EDWARD MOSES. 610 South Park Ave., Independence, Mo.
- STEECE, EMMET ARNER. Supt. of Constr., U. S. Public Bldgs., Gaffney, S. C.
- STONE, EVERETT EDWARD. 154 Long Hill St., Springfield, Mass.
- SUBLETTE, GEORGE WASHINGTON. Cons. Engr.; Const. Engr. and Contr., 3315 Irving Ave., South, Minneapolis, Minn.
- SUHR, OTTO BRUNO. 2219 Crenshaw Boulevard, Los Angeles, Cal.
- SUMNER, ROBERT SWAN. 845 York St., Denver, Colo.
- SWANKER, JOHN EDWARD. 1232 West Hilton St., Philadelphia, Pa.
- THOMPSON, ROBERT ANDREW. Chf. Engr., California R. R. Comm., 833 Market St., San Francisco, Cal.

MEMBERS (*Continued*)

- THOMSON, REGINALD HEBER. Parliament Bldg., Victoria, B. C., Canada.
THORNLEY, JULIAN. 145 East 21st St., New York City.
THURBER, CLINTON DRAPER. Civ. Engr., U. S. N., Navy Dept., Bureau of Yards and Docks, Washington, D. C.
TÖNNESSEN, TOBIAS. Bygdo-Allé 51, Christiania, Norway.
VAN NORDEN, RUDOLPH WARNER. Cons. Engr., Care, *Journal of Electricity*, Rialto Bldg., San Francisco, Cal.
VAN SANT, ROBERT LAWRENCE. Contr. Engr., Room 719, Fullerton Bldg., St. Louis, Mo.
VINCENT, JAMES IRVING. 8547 Loomis St., Chicago, Ill.
VON PIONTKOWSKI, EDGAR STANISLAUS. Care, F. C. Baird, Sea Girt, N. J.
WHARF, ALLISON JAMES. Supt. of Constr., J. E. & E. C. Wharf, 5036 Sunnyside Ave., Chicago, Ill.
WILSON, HENRY FELIX, JR. 1009 South 13th St., Birmingham, Ala.
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MCKEAN, HARRY PARKER. 3620 West 32d Ave., Denver, Colo.
MCMULLEN, RAY WEBB. New Canaan, Conn.
MANZANILLA Y CARBONELL, JOSÉ JUSTO. Asst. Engr., Huston Contr. Co., Isabela de Sagua, Santa Clara, Cuba.
MARSH, CHARLES REED. Supt. of Constr., U. S. Public Bldgs., Treasury Dept., U. S. P. O., Johnstown, Pa.
MONETT, HARRY. Apartment 31, Lafayette Apartments, Dwight Way, Berkeley, Cal.
MOORE, JAMES GATES. Care, Trumbo Dredging Co., West Palm Beach, Fla.
MOTT, THOMAS CLAYTON. Eng. Insp., Board of Water Supply, 154 East 175th St., New York City.
MUCHEMORE, HARRIE LANGDON. Expert Aid, Public Works Dept., Puget Sound Navy Yard, Box 797, Bremerton, Wash.
O'DONNELL, CHARLES JEROME. 1075 Saratoga St., East Boston, Mass.
OTTOSEN, PETER HILL. Lieut., Coast Artillery Corps, U. S. A., Fort Flagler, Wash.
PAGE, STEPHEN EUGENE. 325 Sixth Ave., Newark, N. J.
PARSONS, MAURICE GIESY. Care, Stone & Webster, Camp No. 1, Auberry, Cal.
PORTER, HARRY FRANKLIN. 5519 Kimbark Ave., Chicago, Ill.
POTTER, EDWIN JAMES. Y. M. C. A., Lawrence, Mass.
REED, FRANK EDWARD. Asst. Engr., New York State Highway Dept., Hunter-in-the-Catskills, N. Y.
REESE, GEORGE WASHINGTON. Box 66, Y. M. C. A., Denver, Colo.
REYNOLDS, LEON BENEDICT. Care, Burns & McDonnell, Scarritt Bldg., Kansas City, Mo.
REYNOLDS, ROBERT ALBERT. 1702 Military St., Port Huron, Mich.
RHODES, GLENN VERNON. Knights Ferry, Cal.
RIBLET, HARRY GAILLARD. 71 William St., Montreal, Que., Canada.
ROBERTS, RICHARD FRANCIS. Engr. for S. W. Bonsall, 329 Fifth Ave. (Res., 503 West 140th St.), New York City.
ROWE, WILFRED LINCOLN. 307 South 10th Ave., North Yakima, Wash.
RUSSELL, ALEXANDER ALLEN MACVICAR. 394 Sixty-first St., Oakland, Cal.
RUSSELL, ALEXANDER STUART. Florence, Cal.
SANGER, WALTER MAX. 635 Lincoln Ave., Toledo, Ohio.
SCHARFF, MAURICE ROOS. Asst. to Morris Knowles, Cons. Engr., 2548 Oliver Bldg., Pittsburgh, Pa.
SEE, RUSSELL ALVA. New Florence, Mo.

JUNIORS (*Continued*)

- SMITH, ALEXANDER CRAWFORD, JR. With The United Gas Impvt. Co. of Philadelphia, 604 St. Paul St., Baltimore, Md.
- SPENGLER, JOHN HENRY. 4357 Oakenwald Ave., Chicago, Ill.
- SPERRY, AUSTIN RUSSELL WILLARD. 2328 Webster St., Berkeley, Cal.
- STEWART, WALTER PHELPS. 570 East Madison St., Portland, Ore.
- STILSON, CHARLES EDWARD. Care, Knoxville Power Co., Fairfax, N. C.
- STRAIN, BENJAMIN. Asst. Engr., Cent. N. E. Ry. Co., Chester, Mass.
- STROHL, RICHARDS MERLE. Draftsman, Edward Ford Plate Glass Co., Genoa, Ohio.
- STROUT, GALE STANLEY. 93 Parkside Drive, Berkeley, Cal.
- TINGLEY, FRANCIS. Care, Altoona & Logan Val. Elec. Ry. Co., Altoona, Pa.
- TORRALBAS, RAFAEL JOAQUIN. Asst. Div. Engr., Sewerage and Paving Contract (Res., 26 Correa St., J. del Monte), Havana, Cuba.
- TURNER, ARTHUR HUBESTY. Care, The Trussed Concrete Steel Co., Detroit, Mich.
- WARNOCK, WILLIAM HAROLD. Asst. Engr., Board of Water Supply, City of New York, Engr.'s Office, 41st St. and Sixth Ave., New York City.
- WATSON, GEORGE LINTON. Cons. Engr., 3249 North 15th St., Philadelphia, Pa.
- WEBER, DANIEL RISHEL. Care, U. S. Reclamation Service, Indian Creek Dist., Thistle, Utah.
- WEST, EDWARD HAZZARD. U. S. Junior Engr., Lock and Dam No. 48, Ohio River, Geneva, Ky.
- WILMOT, JAMES. 705 West 170th St., New York City.
- WILMOT, SYDNEY. 1021 East 14th St., Flatbush, N. Y.
- WINTON, WALTER FERRELL. Second Lieut., U. S. A., Ft. Wm. McKinley, Rizal, Philippine Islands.
- YOUNG, OLIVER EARLE. Care, Amalgamated Phosphate Co., Chicora, Fla.

REINSTATEMENTS.

MEMBERS

	Date of Reinstatement.
ROGGE, JOHN CHARLES LEWIS.....	May 28, 1912
WHISTLER, THOMAS DELANO.....	April 2, 1912

DEATHS

- CARTER, ALFRED ELLSWORTH. Elected Associate Member, June 4th, 1902; Member, April 4th, 1911; died June 11th, 1912.
- CHILDS, JAMES EDMUND. Elected Member, December 4th, 1878; died July 16th, 1912.
- COLVIN, DONALD DEAN. Elected Associate Member, May 6th, 1908; died July 2d, 1912.
- GEDDES, JAMES KENNON. Elected Member, January 2d, 1890; died June 6th, 1912.

- HANNA, WALTER SCOTT. Elected Junior, October 6th, 1903; Associate Member, June 5th, 1907; died July 4th, 1912.
- HERBERT, ARTHUR POWIS. Elected Member, September 5th, 1888; died June 16th, 1912.
- HOGG, JAMES BREADING. Elected Member, October 3d, 1906; died June 4th, 1912.
- HOWE, WILLIAM BELL WHITE. Elected Member, March 1st, 1893; died February 11th, 1912.
- KEATING, EDWARD HENRY. Elected Member, June 7th, 1882; died June 17th, 1912.
- MORSE, CHARLES JAMES. Elected Member, February 6th, 1884; died December 6th, 1911.
- MYERS, WILLIAM MADISON. Elected Associate Member, October 3d, 1906; died April 4th, 1912.
- READ, ROBERT LELAND. Elected Member, September 2d, 1874; died June 9th, 1912.
- SMITH, CECIL BRUNSWICK. Elected Member, March 1st, 1905; died July 1st, 1912.

**Total Membership of the Society, August 1st, 1912,
6 611.**

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(May 3d to August 1st, 1912)

NOTE.—This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

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| (1) <i>Journal</i> , Assoc. Eng. Soc., Boston, Mass., 30c. | (28) <i>Journal</i> , New England Water-Works Assoc., Boston, Mass., \$1. |
| (2) <i>Proceedings</i> , Engrs. Club of Phila., Philadelphia, Pa. | (29) <i>Journal</i> , Royal Society of Arts, London, England, 6d. |
| (3) <i>Journal</i> , Franklin Inst., Philadelphia, Pa., 50c. | (30) <i>Annales des Travaux Publics de Belgique</i> , Brussels, Belgium, 4 fr. |
| (4) <i>Journal</i> , Western Soc. of Engrs., Chicago, Ill., 50c. | (31) <i>Annales de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand</i> , Brussels, Belgium, 4 fr. |
| (5) <i>Transactions</i> , Can. Soc. C. E., Montreal, Que., Canada. | (32) <i>Mémoires et Compte Rendu des Travaux</i> , Soc. Ing. Civ. de France, Paris, France. |
| (6) <i>School of Mines Quarterly</i> , Columbia Univ., New York City, 50c. | (33) <i>Le Génie Civil</i> , Paris, France, 1 fr. |
| (7) <i>Gesundheits Ingenieur</i> , München, Germany. | (34) <i>Portefeuille Economiques des Machines</i> , Paris, France. |
| (8) <i>Stevens Institute Indicator</i> , Hoboken, N. J., 50c. | (35) <i>Nouvelles Annales de la Construction</i> , Paris, France. |
| (9) <i>Engineering Magazine</i> , New York City, 25c. | (36) <i>Cornell Civil Engineer</i> , Ithaca, N. Y. |
| (10) <i>Cassier's Magazine</i> , New York City, 25c. | (37) <i>Revue de Mécanique</i> , Paris, France. |
| (11) <i>Engineering</i> (London), W. H. Wiley, New York City, 25c. | (38) <i>Revue Générale des Chemins de Fer et des Tramways</i> , Paris, France. |
| (12) <i>The Engineer</i> (London), International News Co., New York City, 35c. | (39) <i>Technisches Gemeindeblatt</i> , Berlin, Germany, 0,70 m. |
| (13) <i>Engineering News</i> , New York City, 15c. | (40) <i>Zentralblatt der Bauverwaltung</i> , Berlin, Germany, 60 pfg. |
| (14) <i>The Engineering Record</i> , New York City, 10c. | (41) <i>Elektrotechnische Zeitschrift</i> , Berlin, Germany. |
| (15) <i>Railway Age Gazette</i> , New York City, 15c. | (42) <i>Proceedings</i> , Am. Inst. Elec. Engrs., New York City, \$1. |
| (16) <i>Engineering and Mining Journal</i> , New York City, 15c. | (43) <i>Annales des Ponts et Chaussées</i> , Paris, France. |
| (17) <i>Electric Railway Journal</i> , New York City, 10c. | (44) <i>Journal</i> , Military Service Institution, Governors Island, New York Harbor, 50c. |
| (18) <i>Railway and Engineering Review</i> , Chicago, Ill., 15c. | (45) <i>Mines and Minerals</i> , Scranton, Pa., 25c. |
| (19) <i>Scientific American Supplement</i> , New York City, 10c. | (46) <i>Scientific American</i> , New York City, 15c. |
| (20) <i>Iron Age</i> , New York City, 20c. | (47) <i>Mechanical Engineer</i> , Manchester, England, 3d. |
| (21) <i>Railway Engineer</i> , London, England, 1s. 2d. | (48) <i>Zeitschrift</i> , Verein Deutscher Ingenieure, Berlin, Germany, 1,60m. |
| (22) <i>Iron and Coal Trades Review</i> , London, England, 6d. | (49) <i>Zeitschrift für Bauwesen</i> , Berlin, Germany. |
| (23) <i>Bulletin</i> , American Iron and Steel Assoc., Philadelphia, Pa. | (50) <i>Stahl und Eisen</i> , Düsseldorf, Germany. |
| (24) <i>American Gas Light Journal</i> , New York City, 10c. | (51) <i>Deutsche Bauzeitung</i> , Berlin, Germany. |
| (25) <i>American Engineer</i> , New York City, 20c. | (52) <i>Rigaskie Industrie-Zeitung</i> , Riga, Russia, 25 kop. |
| (26) <i>Electrical Review</i> , London, England, 4d. | |
| (27) <i>Electrical World</i> , New York City, 10c. | |

- (53) *Zeitschrift, Oesterreichischer Ingenieur und Architekten Verein*, Vienna, Austria, 70h.
 (54) *Transactions*, Am. Soc. C. E., New York City, \$4.
 (55) *Transactions*, Am. Soc. M. E., New York City, \$10.
 (56) *Transactions*, Am. Inst. Min. Engrs., New York City, \$6.
 (57) *Colliery Guardian*, London, England, 5d.
 (58) *Proceedings*, Engrs.' Soc. W. Pa., 803 Fulton Bldg., Pittsburgh, Pa., 50c.
 (59) *Proceedings*, American Water Works Assoc., Troy, N. Y.
 (60) *Municipal Engineering*, Indianapolis, Ind., 25c.
 (61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
 (62) *Industrial World*, 59 Ninth St., Pittsburgh, Pa., 10c.
 (63) *Minutes of Proceedings*, Inst. C. E., London, England.
 (64) *Power*, New York City, 5c.
 (65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
 (66) *Journal of Gas Lighting*, London, England, 6d.
 (67) *Cement and Engineering News*, Chicago, Ill., 25c.
 (68) *Mining Journal*, London, England, 6d.
 (69) *Der Eisenbau*, Leipzig, Germany.
 (70) *Engineering Review*, New York City, 10c.
 (71) *Journal*, Iron and Steel Inst., London, England.
 (71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.
 (73) *Electrician*, London, England, 18c.
 (74) *Transactions*, Inst. of Min. and Metal., London, England.
 (75) *Proceedings*, Inst. of Mech. Engrs., London, England.
 (76) *Brick*, Chicago, Ill., 10c.
 (77) *Journal*, Inst. Elec. Engrs., London, England, 5s.
 (78) *Beton und Eisen*, Vienna, Austria, 1,50m.
 (79) *Forscherarbeiten*, Vienna, Austria.
 (80) *Tonindustrie Zeitung*, Berlin, Germany.
 (81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.
 (83) *Progressive Age*, New York City, 15c.
 (84) *Le Ciment*, Paris, France.
 (85) *Proceedings*, Am. Ry. Eng. Assoc., Chicago, Ill.
 (86) *Engineering-Contracting*, Chicago, Ill., 10c.
 (87) *Railway Engineering and Maintenance of Way*, Chicago, Ill., 10c.
 (88) *Bulletin of the International Ry. Congress Assoc.*, Brussels, Belgium.
 (89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., \$5.
 (90) *Transactions*, Inst. of Naval Archts., London, England.
 (91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.
 (92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.
 (93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.
 (94) *The Boiler Maker*, New York City, 10c.
 (95) *International Marine Engineering*, New York City, 20c.
 (96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.
 (98) *Journal*, Engrs. Soc. Pa., Harrisburg, Pa., 30c.
 (99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, \$2.
 (100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., 50c.
 (101) *Metal Worker*, New York City, 10c.
 (102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.
 (103) *Mining and Scientific Press*, San Francisco, Cal., 10c.
 (104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.
 (105) *Metallurgical and Chemical Engineering*, New York City, 25c.
 (106) *Transactions*, Inst. of Mining Engrs., London, England, 6s.
 (107) *Schweizerische Bauzeitung*, Zürich, Switzerland.
 (108) *Southern Machinery*, Atlanta, Ga., 10c.

LIST OF ARTICLES

Bridges.

- Recent Practice in Reinforced Concrete Bridge Building in the City of Pittsburgh.*
 J. A. Ferguson. (58) Apr.
 Vertical Lift Bridge at Kansas City, U. D. B. & T. Co.* (87) May.
 Pine Creek Bridge, Pennsylvania R. R.* (87) May.
 The Monroe Street Bridge, Spokane, Wash.* (60) May.
 The "Heel Trunnion" Bascule Bridge.* (13) May 2.
 High Bridge Piers in India. (From *Indian Engineering*.) (14) May 4.
 A Reinforced Concrete Arch Culvert in Cuba.* (14) May 4.
 The Walnut Street Bridge, Des Moines, Iowa.* (14) May 4.
 Flat Slab Bridges. W. H. Finley. (Abstract of paper read before the National Assoc. of Cement Users.) (14) May 4; (96) May 23.
 New Terminals for Brooklyn Bridge.* (13) May 9.

*Illustrated.

Bridges—(Continued).

- The First Reinforced-Concrete Arch Bridge in Japan. (13) May 9.
 Rapid Construction of a Small Concrete Bridge.* F. E. Green. (13) May 16.
 A Temporary Cement-Wash Protection for Bridge Timbers. (14) May 18.
 Bascule Bridges over Buffalo Ship Canal.* Emile Low, M. Am. Soc. C. E. (15) May 24.
 The Substructure of the St. Louis River Bridge.* (14) May 25.
 Remarks on the Quebec Bridge, and a Proposed Cantilever Design.* C. A. P. Turner. (13) May 30.
 Viaduct Approach of Cellular Type.* S. W. Bowen. (13) May 30.
 Rebuilding the Missouri River Bridge at Sibley.* (87) June.
 Ogden Avenue Viaduct, B. & O. R. R.* (87) June.
 Construction of the Montezuma Bridge.* (14) June 1.
 Deck Spans of Susquehanna River Bridge.* (14) June 8.
 Economic Panel Lengths for Long-Span Highway Bridges.* H. G. Tyrrell. (13) June 13.
 The Tunkhannock Creek Bridge on the Lackawanna Railroad.* (13) June 13.
 Operating the Swing Span of the Black Rock Bridge. (14) June 15.
 Street Bridges over the Great Northern Ry. Tracks in Minneapolis.* O. B. Robbins. (13) June 20.
 A Temporary Railroad Swing Bridge.* (14) June 22.
 The Double Track Havana Terminal Viaduct.* (14) June 22.
 Method and Cost of Jacketing with Concrete the Underwater Portions of a Bridge Substructure.* E. E. Greenwood. (Paper read before the Maine Soc. of C. E.) (86) June 26.
 Kingshighway Viaduct, St. Louis, Mo.* Mont Schuyler. (13) June 27.
 American Impressions of the Risorgimento Bridge at Rome.* Henry Grattan Tyrrell. (96) June 27.
 A New Floating Bridge for Calcutta.* (12) June 28.
 Extending the Foundation of a Bridge Pier.* (14) June 29.
 Removing and Replacing a Wrecked Timber Truss Span.* (14) June 29.
 The St. Louis River Drawbridge.* (14) June 29.
 Methods of Constructing the Celilo Bridge of the Oregon Trunk Railway.* W. P. Hardesty. (86) July 3.
 Methods and Cost of Constructing a 225-ft. Suspension Bridge over the Salmon River in Idaho. (86) July 3.
 An American Bridge Surmounted by Buildings.* Emile Low. (13) July 4.
 Description of Reinforced Concrete Arch over Current River, City of Port Arthur, Ontario.* L. M. Jones, A. M. Can. Soc. C. E. (96) July 4.
 The River Span of the Central Avenue Viaduct at Cleveland.* (14) July 6.
 A Reinforced Concrete Highway Bridge at Columbus, Georgia.* (14) July 6.
 Pier Settlement on the Una Bridge, Grand River, Colo.* (13) July 11.
 Girder Bridge with Shallow Trough Floor.* (14) July 13.
 Building Piers of Two Railroad Bridges in Wet Foundations. (14) July 13.
 A Comparison of Gas and Electric Power for Drawbridge Swinging. (13) July 18.
 Small Vertical-Lift Drawbridges.* (13) July 18.
 A Heavy Short-Span Overhead City Bridge.* (14) July 20.
 An Economic Comparison of Bridges, Ferry Bridges and Tunnels, as Crossings of Navigable Waterways.* A. Fortl. (Paper read before the Internat. Cong. of Navigation.) (86) July 24.
 A Water-Conduit Suspension Bridge, Feurs, France.* (13) July 25.
 Calumet River Drawbridge Substructure.* (14) July 27.
 The Advantages and Disadvantages of Structures of Various Types for Crossing Navigable Waterways, Babin, Cablentz and Tartrat. (Paper read before the Internat. Cong. of Navigation.) (86) July 31.
 Etude Elastique d'un Voussoir.* Bonneau. (43) Mar.
 Les Ponts de Constantine; Le Pont du Sidi Rached.* Boismier. (43) May.
 Concours pour la Construction d'un Nouveau Pont Fixe sur le Rhin à Cologne: Rapport de Mission.* F. Zanen, L. Descans et J. Rimbaut. (30) June.
 Pont en Béton Armé, sur le Var, à La Mescla; Chemin de Fer Electrique de la Vallée de la Tinée.* James Boudet. (35) Serial beginning July.
 Statisch bestimmter Bogenträger mit ein oder mehreren Oeffnungen. Chr. Vlachos. (81) Heft 3.
 Über den Bau der neuen Quebecbrücke.* G. Chr. Mehrstens. (69) Feb.
 Der dreikantige und dreiwandige Träger, deren Berechnung und Anwendung.* Josef Selzer. (69) Apr.
 Zur Bewertung der Klappbrücke mit fester Drehachse gegenüber der Rolllappbrücke mit Beweglicher Drehachse.* L. Brackebusch. (69) Apr.
 Die Quebecbrücke.* G. Kriwoschein. (69) Apr.
 Umbau der alten Eisenbahnbrücke über die Iller bei Kempten (Allgäu) zu einer städtischen Strassenbrücke.* M. Vicari. (39) Apr. 5.
 Erfahrungen über die Knicksicherheit von Druckstäben. H. Zimmermann. (40) Apr. 10.

*Illustrated.

Bridges—(Continued).

- Der Neubau der Arndtstrassen-Ueberführung in Königsberg i. Pr.* Ernst Schönewald. (51) Serial beginning Apr. 13.
- Talübergang bei Erbach (Westerwald).* Koester. (78) Serial beginning Apr. 20.
- Die Ausführung des eingespannten oder kontinuierlichen Eisenbetonträgers mit wechselndem Druckgurt nach dem System Eichholz.* Schellnegger. (78) Apr. 20.
- Versuche mit Nietverbindungen und Brückentellen.* (69) Serial beginning May.
- Die Rossbrücke über die Enz in Pforzheim.* A. Kleinlogel. (78) Serial beginning May 8.
- Hängesteg über den Inn bei Brail.* (107) May 11.
- Vom Bau der beiden neuen Rheinbrücken in Köln.* (51) Serial beginning May 25.
- Entwurf einer Rahmenbrücke über die Ems.* R. Busse. (69) June.
- Beitrag zur Verstärkung eiserner Brücken.* Erich Bähr. (69) June.
- Betonbrücke über den kleinen Rhein von Honnef nach Grafenwerth. K. Müller. (78) July 1.
- Wettbewerb für den Bau einer festen Strassenbrücke über den Rhein bei Köln.* Viktor Mautner. (53) July 5.
- Eine Eisenbetonkuppel von 34m. Spannweite.* Spangenburg. (51) Serial beginning June 8.
- Neuere Bauausführungen in Eisenbeton bei der württembergischen Staatseisenbahnverwaltung: Eisenbetonrahmenkonstruktionen: Theorie; Berechnung; Beispiele.* K. W. Schaechterle. (78) Serial beginning July 20.
- Kontinuierliche Träger mit fester Stützenlagerung.* W. Frank. (78) July 20.

Electrical.

- The Lancashire Electric Power Company's System, and Its Application to Lancashire Collieries.* Charles D. Talte. (106) Vol. 43, Pt. 2.
- Apparatus for Metallography.* Carle R. Hayward. (56) Vol. 42.
- Schaffhausen Town Electricity Works, Switzerland.* (75) July, 1911.
- Lötsch Water-Power Electricity Works, Switzerland.* (75) July, 1911.
- Dynamometer Amperemeters and Voltmeters.* J. L. D. Ridsdale. (77) Mar.
- Hysteresis Loss in Iron Taken Through Unsymmetrical Cycles of Constant Amplitude.* M. Rosenbaum. (77) Mar.
- The Losses in Induction Motors Arising from Eccentricity of the Rotor.* Charles F. Smith and Eric M. Johnson. (77) Mar.
- An Indicating Coil for Applying the Oscillograph to the Study of Commutation.* David Robertson. (77) Mar.
- Automatic Reversible Battery Boosters.* R. Rankin. (77) Mar.
- Residence Tariffs.* A. H. Seabrook. (77) Mar.
- A Summary of the Theory of the Production of Electric Oscillations.* Aage S. M. Sørensen. (77) Mar.
- An Automatic Starting Device for Asynchronous Motors.* N. Pensabene-Perez. (77) Mar.
- The Limitations of Direct Current Transmission in Electric Railway Operation.* Mason D. Pratt. (98) Apr.
- A New Method of Impact Excitation of Undamped Oscillations.* E. L. Chaffee. (From *Proceedings, Am. Academy of Arts and Sciences.*) (73) Apr. 26.
- A 2 000-Frequency Alternator.* W. Duddell. (Abstract of paper read before the Physical Soc.) (73) Apr. 26.
- The Marconi System of Wireless Telegraphy.* (73) Apr. 26.
- Notes on Underground Conduits and Cables.* C. T. Mosman. (42) May.
- The Action of Electro-Mechanical Forces on the Bath of Induction Furnaces.* Magnus Unger. (105) May.
- The Heat Paths in Electrical Machinery.* Harold D. Symons and Miles Walker. (77) May.
- Dynamos for Motor Road Vehicle Lighting.* J. D. Morgan. (77) May.
- The Application of Automatic Selecting Devices to Telephone Multiple Switchboards.* Alfred H. Dyson. (42) May.
- Plant Efficiency: An Analysis of the Losses of a Hydroelectric System.* J. D. Ross. (42) May.
- Design of Telephone Pole Lines for Conditions West of the Rocky Mountains.* A. H. Griswold. (42) May.
- Practical Joint Pole Construction.* J. E. Macdonald. (42) May.
- Arc vs. Tungsten Street-Lighting in Small Towns. C. E. Stephens. (42) May.
- Underground Electric Distribution. Wm. B. Ligon. (60) May.
- Motor and Control Equipment of Electrically Operated Valves.* H. M. Gassman. (42) May.
- Advantages of Automatic Control in Steel Plant Operation.* Stewart C. Coey. (42) May.
- Direct-Current and Alternating-Current Mill Motors for Auxiliary Drives.* Brent Wiley. (42) May.

*Illustrated.

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Electrical—(Continued).

- The Operation of a Large Electrically Driven Reversing Rolling Mill.* Wilfred Sykes. (42) May; (19) June 15.
- Electric Braking of Induction Motors.* H. C. Specht. (42) May.
- Compression Chamber Lightning Arrester and the Protection of Distribution Circuits.* E. E. F. Creighton and F. R. Shavor. (42) May.
- Human Accuracy: Multi-Recorder for Lightning Phenomena and Switching.* E. E. F. Creighton, H. E. Nichols, and P. E. Hosegood. (42) May.
- Propagation of Impulse Over a Transmission Line.* J. H. Cunningham and C. M. Davis. (42) May.
- Electrical Characteristics of the Suspension Insulator.* F. W. Peek, Jr. (42) May.
- Flashing-Over in Commutator Machines: Its Cause and Prevention. W. W. Firth. (77) May.
- Electric Furnaces for Heating Bars and Billets. Thaddeus F. Baily. (Paper read before the Am. Electrochemical Soc.) (105) May.
- Some Mechanical Consideration of Transmission Systems.* T. A. Worcester. (42) May.
- Some General Principles Involved in the Electrical Driving of Rolling Mills.* C. Anthony Ablett. (77) May.
- Investigation and Care of Return Railway Circuits. E. E. Nelson. (Paper read before the Southwestern Elec. and Gas Assoc.) (96) May 2.
- Railway, Telephone and Other Poles. (96) May 2.
- Concrete Telegraph Poles Across Marshy Ground.* George Gibbs. (Paper read before the National Assoc. of Cement Users.) (96) May 2.
- The Cost of Train Lighting. C. Toone. (26) May 3.
- Radiotelegraphy with Special Regard to Ship Installations.* Bredow. (Abstract of paper read before the Schiffbautechnische Gesellschaft.) (11) May 3.
- Mining Switchgear.* (22) May 3.
- Fault Location in Mining Cables.* G. B. Burrows. (Paper read before North of England Branch of the Assoc. of Min. Elec. Engrs.) (22) May 3.
- Simple Methods for Increasing Efficiency in Small Power Plants.* L. B. Webster. (27) May 4.
- Guyed Mast Wire Crossing.* R. D. Coombs. (27) May 4.
- New Hydroelectric Plant of the Shawinigan Power & Water Co.* Julian C. Smith and F. T. Kaelin. (27) Serial beginning May 4.
- Removable-Panel Switchboard and Instrument Columns.* Warren H. Miller. (27) May 4.
- High-Efficiency Lamps for Street Railway Service.* S. E. Doane. (Abstract of paper read before the Iowa Street and Interurban Ry. Assoc.) (17) May 4.
- Georgetown Power Station of the Capital Traction Company.* (17) May 4.
- Electric Cranes for Steel Mill Service. E. Friedlaender. (Abstract of paper read before the Iron and Steel Elec. Engrs.) (96) May 9.
- Two 3 000-Kilowatt Turbo-Alternators for the Argentine.* (12) May 10.
- The Characteristics of Copper and Aluminum Overhead Line Conductors.* E. U. Pannell. (26) Serial beginning May 10. (96) July 18.
- Lighting of the Underground Railways of London.* (27) May 11.
- Sags and Tensions of Overhead Conductors.* Alfred Still. (27) May 11.
- 140 000-Volt Power Transmission.* (13) Serial beginning May 16.
- W. T. Henley's Telegraph Works Co.'s Cable Factories, Woolwich and Gravesend.* (26) May 17.
- The Manufacture of Nitrates from the Atmosphere.* Ernest Kilburn Scott. (29) May 17.
- Determination of Load Centers of Circuit.* M. C. Rice. (27) May 18.
- Adjustable-Speed Motors.* Alexander Dawes Du Bois. (27) Serial beginning May 18.
- Wireless for Railroads. Frank W. Prentiss. (Abstract of paper read before the Central Ry. Club.) (62) May 20.
- The Pacific Gas & Electric Co.* A. R. Maujer. (64) May 21.
- The Telefunken Compass.* (73) May 24.
- Largest Central Station in the State of Kansas.* (27) May 25.
- Safeguards for Electric Cranes.* Edward K. Hammond. (20) May 30.
- The Choice of Reflectors for Street Lighting.* L. Bloch. (Abstract from *Elektrotechnik und Maschinenbau*.) (73) May 31.
- Electrically Driven Rolling Mill at Dalzell Works, Motherwell.* (22) May 31.
- Investigation of Municipal Lighting for Rockland, Mass. (60) June.
- Dry Cells, Their Uses and Testing.* Committee, Electrochemical Soc. (105) June; (47) June 7.
- Measurements of Maximum Values in High Voltage Testing. C. H. Sharp and F. M. Farmer. (42) June.
- Incandescent Lamps as Resistances. T. H. Amrine. (42) June.
- Wheatstone Bridge-Rotating Standard Method of Testing Large Capacity Watt-Hour Meters.* C. H. Ingalls and J. W. Cowles. (42) June.
- Frequency.* (For Commercial Power and Lighting.) D. B. Rushmore. (42) June.

*Illustrated.

Electrical—(Continued).

- Measurements of Voltage and Current Over a Long Artificial Power-Transmission Line at 25 and 60 Cycles per Second.* A. E. Kennelly and F. W. Lieberknecht. (42) June.
- Thirty Years' Progress in the Electric Furnace. F. A. J. Fitzgerald. (42) June.
- Simplification of Electro-Thermal Calculations; The Watt and Thermal Ohm. Carl Hering. (42) June.
- The Transient Reactions of Alternators.* William A. Durgin and R. H. Whitehead. (42) June.
- Vacua. W. R. Whitney. (42) June.
- Military Telegraph Lines Using the Polarized Sounder as Receiving Instrument.* George R. Guild. (42) June.
- Motor Starting Currents as Affecting Large Transmission Systems.* P. M. Lincoln. (42) June.
- Operating Characteristics of Large Turbo-Generators.* A. B. Field. (42) June.
- Development of a Successful Direct-Current 2 000 k.w. Unipolar Generator.* B. G. Lamme. (42) June.
- Electrolytic Corrosion of Iron by Direct Current in Street Soil. Albert F. Ganz. (42) June.
- The Vibrations of Telephone Diaphragms.* Charles F. Meyer and J. B. Whitehead. (42) June.
- The Squirrel-Cage Induction Generator.* H. M. Hobart and E. Knowlton. (42) June.
- Characteristics and Applications of Vibration Galvanometers. Frank Wenner. (42) June.
- The Problems of Interior Illumination.* Bassett Jones, Jr. (42) June.
- Measuring Stray Currents in Underground Pipes.* Carl Hering. (42) June.
- Electrical Transmission of Electrical Measurements.* O. J. Bliss. (42) June.
- Measurement of Alternating Current of Low Value. M. G. Newman. (42) June.
- Electrical Measurements with Special Reference to Lamp Testing.* Evan J. Edwards. (42) June.
- Measurement of Energy with Instrument-Transformers. Alexander Maxwell. (42) June.
- Induction Type Indicating Instruments.* Paul Macgahan. (42) June.
- Compensating Wattmeters. A. L. Ellis. (42) June.
- Potential Transformer Testing. J. R. Craighead. (42) June.
- Alternating-Current Development in America.* William Stanley. (3) June.
- Searchlights.* J. M. Heslop. (10) June.
- Western Transmission Systems.* (27) June 1.
- World's Largest Transmission System* (Pacific Gas & Electric Company.) (27) June 1.
- A 100 000-Volt Transmission on the Roof of the Continent.* (27) June 1.
- Wiring and Illumination.* Harold P. Jennings. (27) June 1.
- The Municipal Plant at Seattle.* (27) June 1.
- Locating Cable Grounds.* J. W. Himmelsbach. (64) June 4.
- Electrolysis Investigation and Ordinance at Chicago.* (13) June 6.
- Some Points in the Use and the Theory of the Oscillograph. J. K. A. Wertheim Salomonson. (73) June 7.
- A New Electric Lift.* (26) June 7.
- A New Form of Candles-per-Watt Meter for Incandescent Electric Lamps.* Herbert E. Ives. (27) June 8.
- Switchboard Connections for Testing Meters.* G. C. Cassard. (64) June 11.
- Methods and Cost of Constructing Wooden Towers for a High Tension Transmission Line 25 Miles Long.* O. G. Steele. (From *Journal of Electricity Power and Gas*.) (86) June 12.
- High-Tension Direct Current Transmission of Electricity.* (12) June 14.
- Westinghouse Turbo-Blowers and Compressors.* (57) June 28; (22) June 14.
- Electric Furnaces at Lluvia de Oro.* H. R. Conklin. (16) June 15.
- Extension of the Redondo Station of the Pacific Light & Power Co.* (27) June 15.
- Transformer Connections.* Cecil P. Poole. (64) June 18.
- The Design of Induction Motor Shafts to Resist Deflection.* Bradley T. McCormick. (96) June 20.
- Electric Driving in a Keighley Mill.* (26) June 21.
- A Scientific Test of the Electric Truck.* John Ritchie, Jr. (46) June 22.
- The Ocoee Hydro-Electric Development.* (14) June 22.
- Rotary Converters and their Operation.* Norman G. Meade. (64) Serial beginning June 25.
- Standard Instrument and Transformer Windings.* Charles C. Garrard. (73) June 28.
- A Method of Determining the Distance of a Partial Disconnection in a Submarine Cable.* Chas. E. Hay. (26) June 28.

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Electrical—(Continued).

- The New Marconi Works at Chelmsford.* (12) June 28.
 Metal-Filament Lamps of High Power in Use on Railways.* H. Marchand. (88) July.
 Note on the Use of High-Power Metal-Filament Lamps by the Administration of the Belgian State Railway. J. B. Thonet. (88) July.
 Corona Losses Between Wires at High Voltages.* C. Francis Harding. (42) July.
 Determination of Power Efficiency of Rotating Electric Machines.* E. M. Olin. (42) July.
 To Measure an Alternating-Current Resistance and Compare it with the Direct-Current Resistance, Electro-Dynamometer Method.* Edwin F. Northrup. (42) July.
 Industrial Illumination and the Average Performance of Lighting Systems. C. E. Clewell. (42) July.
 History and Development of Submarine Signaling.* H. J. W. Fay. (42) July.
 The Wiring of Large Buildings for Telephone Service.* Frederick L. Rhodes. (42) July.
 Electric Drive for Paper Machines. J. S. Henderson, Jr. (42) July.
 Single-Phase Induction Motors.* W. J. Branson. (42) July.
 Excitation of Alternating-Current Generators.* D. B. Rushmore. (42) July.
 Application of Electric Drive to Paper Calenders.* E. C. Morse. (42) July.
 Electricity on the Farm.* Putnam A. Bates. (42) July.
 Relay Protective Systems.* L. L. Elden. (42) July.
 Localizers, Suppressors, and Experiments.* E. E. F. Creighton and J. T. Whittlesey. (42) July.
 Permeability Measurements with Alternating Current. L. T. Robinson and J. D. Ball. (42) July.
 Winnipeg Municipal Electric System.* W. G. Chace. (13) July 4.
 The Lay-Out and Erection of Power-House Plant.* E. Kilburn Scott. (Abstract of paper read before the Junior Inst. of Engrs.) (22) July 5.
 Aluminum Conductors for Overhead Transmission Lines. Charles L. Johnson. (27) July 6.
 Submarine Power Cable Installation at Sacramento, Cal.* J. Paulding Edwards. (17) July 6.
 The Construction of Distribution Systems for Outlying Systems and Smaller Plants. S. Bingham Hood. (Abstract of paper read before the Canadian Elec. Assoc.). (96) Serial beginning July 11.
 Curtis Turbo Alternators.* (73) Serial beginning July 12.
 The Determination of Tramway Networks.* A. J. Lawson, M. Inst. C. E. (73) July 12.
 The Rallophone Inductive System of Automatic Signaling.* (73) July 12.
 A Direct Method for the Determination of the Radiation Efficiency, Earth Resistance and Radiation Resistance of a Wireless Transmitter. J. Erskine-Murray. (From *Jahrbuch der Drahtlosen Telegraphie*.) (73) July 12.
 Electricity as Used in Brick Plants.* (76) July 15.
 Why Electric Drive Means Economy.* (76) July 15.
 A Submerged Coal Storage Pit at Omaha.* (14) June 15.
 Notes on the Operation of Inductively Coupled Receiving Sets in Wireless Telegraphy.* J. O. Marborgne. (73) July 19.
 An Accurate Examination of the Steinmetz Index for Transformer Iron Saturation and Cast Iron.* F. Stroude. (Paper read before the Physical Soc.) (73) July 19.
 A Peculiar Fracture in a Submarine Cable.* (26) July 19.
 Electricity in Northwest Washington, Generating and Distribution System of the Whatcom County Railway and Light Company of Bellingham, Wash.* (27) July 20.
 Synchronous Motor Performance.* Nicholas Stahl. (27) July 20.
 Laying Out a Cable System Through the River Trave.* (19) July 20.
 The Wirelessly Directed Torpedo.* Benjamin F. Missner. (46) July 20.
 Power Factor, Its Influence and Value. D. H. Ross. (Paper read before the Canadian Elec. Assoc.) (96) July 25.
 Hydro-Electric Station at Gatun Spillway.* (96) July 25; (62) July 22; (14) July 27.
 The High Tension Transmission System of the Hydro-Electric Power Commission of Ontario.* (96) July 25.
 Electricity in Canadian Gold Fields.* (27) July 27.
 Control and Operation of High Voltage Transmission Systems.* Charles P. Steinmetz. (From *General Electrical Review*.) (19) July 27.
 An Efficient Electric Furnace for High Temperatures.* D. F. Calhane and E. D. Bard. (105) Aug.
 Les Effets Mécaniques des Courts-Circuits Brusques sur les Turbo-Alternateurs.* P. Boucherot. (32) Jan.
 La Télégraphie sans Fil sur les Bateaux de Pêche français.* (33) Mar. 30.
 Réseau de Distribution à 110 000 Volts de la Province d'Ontario (Canada).* (33) Apr. 6.

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Electrical—(Continued).

- L'Emploi des Cables en Aluminium pour les Lignes Electriques à Haute Tension. Francis Marre. (33) May 25.
- Bombe Calorimétrique Thermo-Electrique à lecture Directe, pour les Usages Industriels, Système Ch. Féry.* Ch. Féry. (33) May 25.
- La Transmission à 140 000 Volts du Michigan et l'Usine Hydro-Electrique de Cooke.* (33) June 15.
- Einfluss des elektrischen Stromes auf Eisenbeton.* O. Berndt. (Paper read before the Deutsche Beton Verein.) (78) Sup. No. 1.
- Erläuterungen zu den Normalen für die Konstruktion und Prüfung von Wechselstrom-Hochspannungsapparaten für Innerräume. Georg J. Meyer. (41) Serial beginning Apr. 4.
- Ueber Fehlerquellen bei der Bestimmung der Verlustziffer mit dem Epsteinschen Apparat. Karl Schmiedel. (Report of the Physikalisch-Technischen Reichsanstalt.) (41) Apr. 11.
- Ueber Moore-Lichtanlagen.* (48) Apr. 13.
- Telegraphie und Telephonie mit Wechselströmen auf weite Entfernungen. August Maior. (41) Apr. 25.
- Die mit 110 000 V arbeitende Ueberlandzentrale des Staates Ontario (Kanada): Geschichte. Verträge, Kosten. J. Teichmüller. (41) Apr. 25.
- Bericht über die Arbeiten der Kommission für Isolierstoffe.* H. Passavant. (41) May 2.
- Ueber die Temperaturen der Glühlampenfäden und deren Zusammenhang mit der Wirtschaftlichkeit der Lampe. M. v. Pirani and A. R. Meyer. (41) May 2.
- Der Drehstrom-Reihenschlussmotor der Siemens-Schuckertwerke.* M. Schenkel. (41) Serial beginning May 9.
- Betrachtungen über zulässige Kabelbelastungen in Deutschland und England. James Wagner. (41) May 16.
- Bestimmung der Isolationswiderstände von Wechselstromanlagen im Betriebe.* (41) May 16.
- Grosse Gleichstromdynamos für die elektrochemische Industrie.* H. Däschler. (41) May 23.
- Charakteristische und Mechanische Eigenschaften moderner Generatoren, insbesondere solcher höherer Tourenzahl. H. Behn-Eschenburg. (41) June 6.
- Ueber eine neue Bogenlampe für Drehstrom.* W. Wedding. (41) June 6.
- Richtlinien für die Konstruktion von Stütz- und Durchführungsisolatoren.* W. Fellenberg. (41) Serial beginning June 6.
- Hochfrequenzapparate für drahtlose Telegraphie und Telephonie.* Ernst F. W. Alexanderson. (41) June 27.
- Die Interessengemeinschaft württembergischer Elektrizitätswerke.* H. Büggeln. (41) July 4.
- Die neue Wechselstrom-Quarzlampe.* F. Girard. (41) July 4.
- Betrachtungen über die Regulierung der Gleichstrommotoren mittels Ankerparallelwiderstandes.* W. Lehmann. (41) July 4.
- Elnige Versuche mit Oelschaltern.* F. Marguerre. (41) Serial beginning July 11.
- 60 Jahre technischer Entwicklung der Unterseetelegraphie.* Max Roscher. (41) Serial beginning July 11.
- Die Telephonie auf grosse Entfernungen.* E. F. Petritsch. (53) Serial beginning July 12.
- Richtlinien für den Bau grosser Elektrizitätswerke mit Dampfbetrieb.* G. Klingenberg. (41) Serial beginning July 18.
- Elektrische und Petroleum-Beleuchtung.* Berthold Monasch. (41) July 18.
- Marine.**
- Auxiliary Machinery for Internal-Combustion Engined Vessels.* W. R. Cummins. (Paper read before the Inst. of Marine Engrs.) (22) April 26.
- The Italian Submersible Boat, *Atropo*.* (11) April 26.
- Battleship *Florida*, the Latest United States Dreadnought.* Henderson B. Gregory. (95) May.
- Safety Pontoons for Ocean Vessels. Henry R. Towne. (13) May 2.
- Speed Recorder for Argentine Battleships.* (12) May 3.
- Motor Engines for Marine Work.* R. G. L. Markham. (Abstract of paper read before the Inst. of Automobile Engrs.) (12) May 3.
- Three Submarine Tenders.* (12) May 3.
- Marine Motor.* (12) May 3.
- Stern Frame and Brackets of the Cunard Liner *Aquitania*. (12) May 3.
- The Structure of the *Titanic*.* (13) May 9.
- The U. S. Navy's Lead-Lined Piping.* R. D. Gatewood. (Abstract from Proc. U. S. Naval Inst.) (13) May 9.
- Coal or Oil-Fired Marine Boilers for the Dutch Colonial Government.* (11) May 10.
- A Commercial Type Marine Motor.* (12) May 10.

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Marine—(Continued).

- The United States Naval Collier *Neptune*.* (12) May 10.
 A High-Power Oil Engine for Tugboat Service.* (19) May 11.
 Oil-Fire Extinguishers for Naval Vessels. Henry Williams. (13) May 16.
 The Possibilities of Flue Gas Economisers on Board Ship.* R. Royds and J. W. Campbell. (Abstract of paper read before Inst. of Engrs. and Shipbuilders in Scotland.) (22) May 17.
 First Clyde-Built Motor Ship, *Jutlandia*.* (12) May 17; (22) May 17.
 The Welin Davit for Launching Lifeboats.* Axel Welin. (Abstract of paper read before meeting conducted by Am. Museum of Safety.) (13) May 23.
 The Corrosion of Bronze Propeller-Blades.* William Ramsay. (11) May 24.
 The Hamburg-Amerika Passenger and Freight Steamer *Imperator*. (11) May 24; (46) July 6; (95) Aug.
 Water-Tight Sub-Division of Liners.* William Hovgaard. (11) May 24; (12) May 24.
 Relative Possibilities of the Diesel Oil-Engine, Geared Turbine and Suction Gas-Engine, as Compared with the Reciprocating Engine for Marine Propulsion.* (Discussion before the North-east Coast Inst. of Engrs. and Shipbuilders.) (11) May 24.
 Opening of the Naval Drydock, New York.* (46) May 25.
 New Graving Dock on the Tyne.* (12) May 31.
 The Sperry Gyro-Compass.* (11) May 31.
 New French Line Steamship *France*.* (95) June; (12) Apr. 26.
 The *Titanic* Inquiry.* (11) Serial beginning June 14.
 The U. S. Battleship *Maine*.* J. T. Bucknill. (11) June 21.
 Modern Submarine Boats for the United States Navy.* (95) July.
 The Application of the Junkers Oil Engine to Marine Work.* (95) July.
 Russian High-Speed Marine Diesel Engines.* J. Rendell Wilson. (95) July.
 Analysis of the Trial Trips of the Battleship *Florida*.* Sidney G. Koon. (95) July.
 Economy Due to Superheated Steam in Marine Practice. Walter M. McFarland. (95) July.
 Cost, Longevity, and Repairs of Barges, Tow-Boats, and Other Pieces of Floating Plant Used in the United States Improvement of the Upper Mississippi River, 1881-1911.* C. W. Durham. (100) July; (86) July 17.
 Expert Opinions on the Loss of the *Titanic*. (13) July 4.
 The Condition of the *Maine* after 13 Years' Submersion.* Maximilian Toch. (13) July 4.
 Painting the Steelwork of Engine and Fireroom Bilges. Henry Williams. (13) July 4.
 Shipbuilding and Engineering Works at St. Nazaire.* (12) July 5.
 Harland and Wolff's Works at Belfast, Shipbuilding.* (11) Serial beginning July 5.
 The Transporter Ship *Kanguroo* for Submersible Boats.* (11) July 19.
 Ship-Propelling Machinery of Alternative Designs. (11) July 19.
 Liquid Fuel Measurement on Oil Burning Steamships. Howard C. Towle. (95) Serial beginning Aug.
 The New Japanese Battle Cruisers—Launch of the *Kongo*.* F. C. Coleman. (95) Aug.; (11) May 17.
 Shallow Draft Ferry Driven by Gasoline Engines.* (95) Aug.
 Le Renflouement et l'Immersion du Cuirassé *Maine*.* E. Lignorelles. (33) May 4.
 La Catastrophe du *Titanic*, ses Enseignements, et le Danger des Icebergs.* Alexandre Delisle. (33) June 8.
 Le Renflouement du Crouleur Cuirassé Italien *San Giorgio*.* E. Lignorelles. (33) June 15.
 Eisbrechdampfer *Liebe* der Weichselstrombauverwaltung.* Meiners. (49) Pt. 4.

Mechanical.

- A Dust-Fuel Boiler and Its Uses.* Hugh V. Hart-Davis. (106) Vol. 43, Pt. 2.
 The Causes of Boiler Deterioration and Their Remedy. Allen H. Bonner. (106) Vol. 43, Pt. 2.
 The Storage of Anthracite Coal.* R. V. Norris. (56) Vol. 42.
 Anthracite-Culm Briquettes.* Charles Dorrance, Jr. (56) Vol. 42.
 The Preparation of Anthracite. Paul Sterling. (56) Vol. 42.
 The Universal Metalloscope: A Perfected Microscope for the Examination of Metals.* Albert Sauveur. (56) Vol. 42.
 Double-Cutting and High-Speed Planing Machines. J. Hartley Wickstead.* (75) Oct.
 Water Gas Replaces Oil for Furnaces.* (25) Jan.
 Cincinnati Milling Machine Company's New Plant.* (108) March.
 Designing a Lathe Headstock.* R. Hinchliffe. (108) Apr.
 Safety Considerations in Industrial Engineering. David S. Beyer. (58) Apr.
 Some Notes on the Delivery of Gas Through Small Pipes.* Henry O'Connor. (66) Apr. 9.

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Mechanical—(Continued).

- Industrial Value of Lignite. (66) Apr. 9.
 Water Treatment and Boiler Troubles.* W. A. Pownall. (61) Apr. 16.
 Taplay's Combustion Gas Analyzer.* J. G. Taplay. (66) Serial beginning Apr. 23.
 Central Producer Gas Plant at the Vienna Corporation Gas-Works.* Karl Marischka, (Extract from *Journal für Gasbeleuchtung*.) (66) Apr. 23.
 Some Phases of Retort-House Practice.* T. Brooke. (Paper read before the Midland Junior Gas Assoc.) (66) Apr. 23.
 A New Dry Blast Process.* John B. Miles. (22) Apr. 26.
 Ejector Condensers.* Samuel Bullock. (Paper read before the East of Scotland Branch of the Assoc. of Min. Elec. Engrs.) (22) Apr. 26.
 Superheater for Locomotive and Marine Boilers.* (22) Apr. 26.
 New Coal Loading Appliance at Sunderland Docks.* (12) Apr. 26.
 Feed Mechanism for Planing Machines.* (47) Apr. 26.
 The Tosi Steam-Turbines.* (11) Apr. 26.
 3-Ft. and 3-Ft. 6-In. Radial Drilling Machines.* (11) Apr. 26.
 The Effect of Temperature in the Carbonisation of Coal, and Its Bearing upon the Conservation of our Coal Supplies. Vivian B. Lewes. (From Report of British Sci. Guild.) (22) Apr. 26.
 Treatment of Producer Gases. (22) Apr. 26.
 Some Notes on the Efficient Running of Gas Engines.* R. Wardell. (Paper read before the Eastern Counties Gas Mgrs.) (66) Apr. 30.
 Composition of Gas Tars.* P. Schläpfer. (Paper read before the Swiss Assoc. of Gas and Water Engrs.) (66) Apr. 30.
 Scotland and Vertical Retorts. James M'Leod. (Paper read before the Scottish Gas Mgrs.) (66) Apr. 30.
 The Operation of a Large Electrically Driven Reversing Rolling Mill.* Wilfred Sykes. (42) May.
 Design of Formers for Hydraulic Press.* Lewis D. Freeman. (25) May.
 Making Indestructible Hydraulic Cements. Edward Duryee. (67) May.
 Plant of the Ogden Portland Cement Company.* (67) May.
 By-Product Coke Ovens. William E. Hartman. (58) May.
 Recent Developments in Steam Turbine Practice.* K. Baumann. (77) May.
 Manufacture of Seamless Steel Boiler Tubes. J. Jay Dunn. (Paper read before the Am. Boiler Mfrs. Assoc.) (94) May.
 Hydraulic Power.* Joseph Horner. (10) Serial beginning May.
 Construction Features of the Watervliet Shops of the Delaware & Hudson Company. O. D. Lee. (10) May.
 New Developments in Steam Turbine Engineering.* Edwin D. Dreyfus. (4) May.
 Prevention of Smoke by Combustion.* (45) May.
 The Manufacture of Sand Lime Brick in Europe.* P. L. Simpson. (Paper read before the Sand Lime Brick Mfrs. Assoc.) (76) May 1.
 Discolorations on Brick. Charles F. Binns. (76) May 1.
 Fireclay and Refractories Industry.* Francis T. Havard. (76) May 1.
 The Peat Producer Gas Power Plant at the Government Fuel-Testing Station.* B. F. Haanel. (From *Journal of the Canadian Peat Soc.*) (96) May 2.
 A New Steam Meter.* (12) May 3.
 Radial-Flow Steam Turbines.* (11) May 3.
 The Works of the Tata Iron and Steel Company, Limited.* (22) May 3.
 The Purification of Blast-Furnace Gas.* (22) May 3.
 The Michell Thrust-Bearing.* (11) May 3.
 Some Aspects of Diesel Engine Design.* D. M. Shannon. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (11) May 3; (22) Serial beginning May 3.
 Reversibility in Relation to Entropy and to Adiabatic Processes. Thomas B. Morley. (12) May 3.
 A Flying Machine That Folds Its Wings.* (46) May 4.
 Oil Engines for Central-Station Prime Movers. (27) May 4.
 Handling Furnace Charges at Cananea.* Morris Jesup Elsing. (103) May 4.
 Economy of Different Retort-Settings. H. Zollikefer. (From *Journal für Gasbeleuchtung*.) (66) May 7.
 Extensions to the Carbonizing Plant at the East Hull Gas-Works.* R. Nelson. (Paper read before the North of England Gas Mgrs. Assoc.) (66) May 7.
 Corrosion of Metals in Purifier-Houses. J. T. Haddock. (66) May 7.
 Rate of Combustion at Different Stoker Speeds. D. McGregor. (64) May 7.
 Closed Heaters, Surface Condensers.* Edward T. Turner. (64) May 7.
 Efficiencies in the Production of Power.* H. J. Macintire. (64) May 7.
 Results from Burning Screenings. J. F. Mowat. (64) May 7.
 A Heavy Blooming-Mill Engine.* Edward T. Child. (64) May 7.
 Operating Cost of the Motor Truck.* (20) May 9.
 The Niles Tool Works New Foundry.* (20) May 9.
 Casting Pipes Without Cores.* (12) May 10.
 Steam Condensing Equipments.* A. G. Christie. (Paper read before the Univ. of Toronto Eng. Soc.) (22) May 10.

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Mechanical—(Continued).

- Powerful Armour Plate Ripping Machine.* (12) May 10.
 Electric Welding at the Third Avenue Railway Shops.* (17) May 11.
 Notes on the Design of Drill Bits.* Ward Blackburn. (16) May 11.
 Tempering Drill Steel. Clarence C. Semple. (16) Serial beginning May 11.
 Smoke Problem in City of Pittsburgh. (62) May 13.
 Gas Testing for Small Works.* Evan Rees. (Paper read before the Wales and Monmouthshire Dist. Inst. of Gas Engrs. and Mgrs.) (66) May 14.
 Some Notes on Furnace Control.* H. D. Madden. (Paper read before the Wales and Monmouthshire Dist. Inst. of Gas Engrs. and Mgrs.) (66) May 14.
 Central Refrigerating Plant at Atlanta, Ga.* R. C. Turner. (64) May 7.
 Aeolian Company's New Power Plant.* Warren O. Rogers. (64) May 14.
 Raising Water by Compressed Air. Frank Richards. (64) Serial beginning May 14.
 Kinetic Theory of Gases and Steam.* W. H. Booth. (64) May 14.
 Development of Gas Manufacture. Alfred E. Forstall. (Lecture before the Centenary of Gas Lighting.) (83) May 15; (66) May 14.
 Some Observations Regarding Gas Ovens in Europe and America. George F. Goodnow. (Paper read before the Illinois Gas Assoc.) (83) May 15; (24) May 27.
 Volumetric Changes that Occur in Measuring Fluid in the Transition of Same at the Time of Test Through Gas Meters that have been in Service.* C. C. Schiller. (Paper read before the Illinois Gas Assoc.) (83) May 15; (24) June 17.
 High Pressure Line Storage.* Walter P. Schwabe. (83) May 15.
 The Removal of Water from Water-Gas Tar. (83) May 15.
 Influence of Flame Temperature on the Luminous Power of Gas Mantles. (83) May 15.
 Methods and Cost of Operating Automatic Railways for the Storage of Materials in Bulk.* A. Eugene Michel. (86) May 15.
 Geared Steam Turbine for the Rolling Mill.* A. Q. Carnegie. (Abstract of paper read before the West of Scotland Iron and Steel Inst.) (20) May 16.
 A Simple Load-Weighing Apparatus for Large Testing Machines.* (13) May 16.
 Causes of Boiler Explosions. S. F. Jeter. (Abstract of paper read before the Am. Boiler Mfrs. Assoc.) (22) May 17.
 Westinghouse Speed-Reduction Gearing.* (22) May 17.
 Dry Air Blast.* (22) May 17.
 American Aeronautic Motors.* Stanley Yale Beach. (19) Serial beginning May 18.
 The New Eiffel Aerodynamic Laboratory at Auteuil.* (46) May 18.
 Results of Motor-Vehicle Research at the Massachusetts Institute of Technology. (27) May 18.
 Combustion of Coal in Relation to Steam Boiler Economy. E. A. Uehling. (Abstract of paper read before the Ohio Soc. of Mech., Elec. and Steam Engrs.) (62) May 20.
 A New External Prepayment Attachment for Gas Meters.* W. Griffin Gribbel. (24) May 20.
 Description of the Mitcham and Wimbledon Gas Company's Works.* (66) May 21.
 Calculating the Sizes of Feed Pumps. Victor C. Vance. (64) May 21.
 Puzzuolan Cements for the Periyar and La Boquilla Dams. (86) May 22.
 A Combined Coal Dock Elevator and Crusher.* (13) May 23.
 High Pressure Gas Distribution at St. Louis, Mo.* Frank Richards. (13) May 23.
 Auxiliary Plant for Power Stations. A. H. Finch. (Abstract of paper read before the North-East Coast Inst. of Engrs. and Shipbuilders.) (96) Serial beginning May 23; (22) May 3.
 A Brass Foundry of Modern Appointments.* (20) May 23.
 A New Peat Machine.* (96) May 23.
 The Harrison-Hughes Engineering Laboratories at Liverpool University.* (47) May 24.
 Exhaust-Gas Calorimeters for Internal-Combustion Engines.* John S. Nicholson. (11) May 24.
 Four-Cylinder Four-Cycle Diesel Engines.* (11) May 24.
 Briquette Plant for the Italian Navy.* (57) May 24.
 Exhaust Steam Plants for Operating Two-Stage Compressors.* (47) May 24.
 A Power Plant for a Large Country Estate. (14) May 25.
 Handling Freight from Ships' Holds to Cars and Warehouses Using Motor Trucks.* (14) May 25.
 Rope Brakes, Construction and Design.* Julian C. Smallwood. (64) May 28.
 Present Status of the Diesel Engine.* (64) May 28.
 Types of Shaft Bearings for Gyrotory Crushers.* (86) May 29.
 Methods and Costs of Operating Loebnitz Rock Breakers and Drill Boats on the Panama Canal. S. B. Williamson. (Paper read before the International Congress of Navigation.) (86) May 29.

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Mechanical—(Continued).

- A Review of Methods Employed for Removing Subaqueous Rock. Michael Koch. (Paper read before the International Congress of Navigation.) (86) May 29.
 What is the Future of the Oil Engine in the United States? G. H. Kimball. (13) May 30.
 A New Steam Turbine.* (20) May 30.
 Dried Bagasse as Fuel. (11) May 31.
 Turbo Blowers and Turbo Compressors.* (22) May 31.
 Cotts' Controlling Gear.* (57) May 31.
 The Danger of Water Hammer. Report on a Boiler Explosion at a Yorkshire Colliery.* (57) May 31.
 Processes in the Production of Gears.* Walter Betterton. (Paper read before the Inst. of Automobile Engrs.) (47) May 31.
 Cement Grinding.* L. H. Sturtevant. (105) June.
 Commercial and Financial Aspects of the Gas Industry. George B. Cortelyou. (3) June.
 New Apparatus for Gas Analysis.* F. M. Williams. (Paper read before the Am. Chemical Soc.) (105) June.
 Condensers and Condensation for Vacuum Plants.* B. Viola, M. Am. Soc. M. E. (105) Serial beginning June.
 Cox's Air-Gas at Benfleet Station, London, Tilbury and Southend Railway.* (21) June.
 Compressing Natural Gas.* E. D. Leland. (58) June.
 Simple Evolution of Weighing Devices. F. Reichman. (98) June.
 Washing Sand and Gravel.* (67) June.
 Gas Mixing Apparatus for Safety Lamps.* (68) June 1; (22) May 31.
 Application of Chemical Control to the Operation of Water Gas Apparatus. G. W. Wallace. (Paper read before the Illinois Gas Assoc.) (83) June 1; (24) July 22.
 Steam Turbo-Generator Station.* (19) June 1.
 Some Methods of Coke Dust Disposal.* C. J. Bacon. (Paper read before the Illinois Gas Assoc.) (24) June 3.
 Precooling Plant of Southern Pacific.* Le Roy W. Allison. (64) June 4.
 Use of Gas for Heat and Power. E. B. Rosa. (Paper read in Phila. at Gas Centenary.) (66) June 4.
 The Elland System of Intermittent Vertical Retorts. (66) June 4.
 Control of Illuminating Gas Supply in the United States. E. B. Rosa. (Paper read in Phila. at Gas Centenary.) (66) June 4.
 The Re-Constructions at the Sowerby Bridge Gas-Works. (66) June 4.
 A Cost and Time Study of Drilling Blast Holes with Well Drills. R. R. Sanderson. (Abstract of paper read before the Natural Lime Mfrs. Assoc.) (86) June 5.
 The Development of Logging Machinery. R. E. Boehck. (Paper presented to Am. Soc. of Engr. Draftsmen.) (96) June 6.
 Tests of a Simple Engine taking Steam at Less than Atmospheric Pressure.* R. C. Carpenter. (From Sibley Jour. of Eng., May.) (13) June 6; (47) June 21; (12) July 5.
 Making the Ford Motor Car.* O. J. Abell. (20) Serial beginning June 6.
 A Modern Machine Screw Factory.* (20) June 6.
 The Variable Speed Drive for Centrifugal Pumps.* Charles A. Carpenter. (14) June 8; (13) June 6.
 Feeders for Belt Conveyors.* Colby M. Avery. (16) June 8.
 Recent Developments in the Rotary Air Pump and Condenser.* C. E. C. Shawfield. (73) June 7.
 Smokeless Chimneyless Steam Plants.* (19) June 8.
 Making Charcoal Iron Boiler Tubes.* George Thomas. (From paper read before National Assoc. of Am. Boiler Mfrs.) (64) June 11.
 Circulation Test of Robb-Brady Scotch Boiler.* (64) June 11.
 Pumping by Compressed Air. (96) June 13.
 Cargo-Loading and Discharging Appliances at Immingham Docks.* (11) Serial beginning June 14.
 Making Ice with Heat.* Frank C. Perkins. (19) June 15.
 The Dividends that Float up the Chimney—What Smoke Means in Dollars and Cents.* S. B. Flagg. (46) June 15.
 Proposed Regulations for Gas Companies. C. H. Stone. (From Circular 32, U. S. Bureau of Standards.) (83) June 15.
 Modern Gas Lighting. Van Rensselaer Lansing. (Paper read before the Centenary Celebration at Phila.) (83) June 15; (66) May 28; (24) July 1.
 Liquefied Natural Gas. Walter O. Snelling. (Paper read before the Am. Chemical Soc.) (83) June 15; (83) Aug. 1.
 Natural Gas Investigations of the Bureau of Mines. George A. Burrell. (Paper read before the Natural Gas Assoc. of America.) (62) June 17.
 A Laboratory Method for Comparing the Coking Properties of Coal.* R. Lessing. (Paper read before the Inst. of Gas Engrs.) (66) June 18; (57) June 28; (22) June 28.

*Illustrated.



Mechanical—(Continued).

- Evolution of the Stockport Gas-Works.* S. Meunier. (Paper read before the Institution of Gas Engrs.) (66) June 18.
- Some Notes on Carbonization. E. Fearon. (Paper read before the Manchester and District Junior Gas Assoc.) (66) June 18.
- High-Pressure Gas for Manufacturing Purposes.* A. W. Onslow. (Paper read before the Institution of Gas Engrs.) (66) June 18; (22) June 14.
- Safeguards for Power Plant Equipment.* Edward K. Hammond. (64) June 18.
- A New Analysis of Indicator Cards.* J. Paul Clayton. (64) June 18.
- Methods and Costs of Rock Excavation in the Harbors of Aviles, San Esteban de Pravia, and Port de Bilbao, Spain.* Ramon Hernandez. (Paper read before the International Congress of Navigation.) (86) June 19.
- The Southern Pacific Locomotive Boiler Explosion at San Antonio, Texas.* (13) June 20.
- Traction Loading and Unloading Machines for Handling Loose Materials.* (13) June 20.
- The Hele Shaw Rotary Pump and Motor.* (11) June 21.
- Rolling Mill, No. 2 Shaft, Michigan.* P. B. McDonald. (16) June 22.
- Rapid Drills for the Panama Canal.* (14) June 22; (13) July 25.
- The Formation of Sulphuretted Hydrogen in Iron Service Pipes. J. G. Taplay. (66) June 25.
- Estimation of Naphthalene in Gas at the Paris Gas-Works.* M. Laurain. (Paper read before the Société Technique du Gaz.) (66) June 25.
- Pollution of Gas in Holders and the Removal of Carbon Bisulphide.* M. Guillet. (Paper read before the Société Technique du Gaz.) (66) June 25.
- Features of a New Gray Iron Foundry.* (20) June 27.
- Horizontal Boring Machine.* (20) June 27.
- The New Steam-Hydraulic Forging Plant at the New Glasgow Works of the Nova Scotia Steel and Coal Company, Limited.* (96) June 27.
- Electric Furnace Experience at South Chicago. T. W. Robinson. (13) June 27.
- Wood Refuse Suction Gas Producer.* (12) June 28.
- Water-Cooled Devices on Open Hearth Furnaces.* (22) June 28.
- Petrol-Motor Vehicles for Agricultural Purposes.* (11) June 28.
- Machine for Testing Lubricants.* (11) June 28.
- A Plant for the Manufacture of Concrete Brick.* (14) June 29.
- The Bridge and Structural Shops of the American Bridge Company at Gary.* (14) June 29; (20) July 4.
- By-Products in Gas Manufacture.* Charles E. Munroe. (3) July.
- New Shops of the New York Central Iron Works Company.* L. L. Ritchie. (94) July.
- Heat Transmission Through Conducting Surfaces.* (105) July.
- Steam Turbines.* H. Zoelly. (75) July, 1911.
- Description of the Turbines, Condensers, Blowers, etc., Exhibited at the Works of Messrs. Brown, Boveri & Co., Baden, Switzerland.* Eric Brown. (75) July, 1911.
- Power Machinery of the Steel Industry.* Robert L. Streeter. (9) July.
- Modern Diesel Oil-Engines.* J. F. Schubeler. (75) July, 1911.
- Some New Types of Dynamometers.* Alfred Amsler. (75) July, 1911.
- The Mechanical Disposal of Ashes from Steamers.* J. F. Zimmer, A. M. Inst. C. E. (10) July.
- Thermit Welding in Galveston District.* S. E. Lawrence. (100) July.
- San Bernardino Precooling Plant.* C. M. Gay. (87) July.
- Hydraulic Press Dies.* J. H. Nash. (94) July.
- Static and Dynamic Force Relations in Machines.* Walter Rautenstrauch. (6) July.
- Steam Boiler Efficiency and the Most Economical Method for Absorbing Heat from Gases of Combustion.* A. H. Blackburn. (70) July.
- Notes on Water-Tube Boilers of the Torpedo-Boat Type and Their Application to Locomotives.* J. Robert. (88) July.
- Hydraulic Riveting. H. J. Hartley. (Abstract of paper read before the Am. Boiler Mfrs. Assoc.) (108) July.
- Oklahoma Iron Works, Tulsa, Oklahoma.* W. C. Bullen. (108) July.
- Two Pounds' Pressure at the Tip: Why Not? William I. Baltin. (Paper read before the Illinois Gas Assoc.) (24) July 1; (83) June 1.
- Accident Prevention in Gas Works.* (83) July 1.
- The Prepayment Meter. E. C. Weisgerber. (Paper read before the Iowa Gas Assoc.) (83) July 1.
- Surface Combustion.* H. C. Blackwell. (Paper read before the Iowa Gas Assoc.) (83) July 1.
- Construction and Operation of a Modern Water Gas Works in a Small Town. R. K. Runner. (Paper read before the Iowa Gas Assoc.) (83) July 1.
- Availability of Ammonia Machines for Small Plants. C. W. Lockwood. (Paper read before the Iowa Gas Assoc.) (83) July 1.
- Report of the Electrolysis Committee. (Paper read before the German Assoc. of Gas and Water Engrs.) (66) July 2.

Mechanical—(Continued).

- Effect of the Character and Composition of Gas on Its Use. Karle Bunte. (Abstract of paper read before the German Assoc. of Gas and Water Engrs.) (66) July 2.
- The Measurement of the Air or Oxygen Required for the Complete Combustion of Gas. M. André Grebel. (Paper read before the Société Technique du Gaz en France.) M. André Grebel. (66) July 2.
- Small Gas Power Plant.* A. R. Maujer. (64) July 2.
- Coke for Motive Power in Gas-Works.* M. Paul Lhomme. (Paper read before the Société Technique du Gaz.) (66) July 2.
- Combustion and Flue Gas Analysis.* Charles M. Rogers. (64) July 2.
- Limiting Efficiencies of Steam Plants. R. C. H. Heck. (64) July 2.
- Estimated Cost of Making Cement in Oregon.* (86) July 3.
- Wear of Conveyor Belts and Analysis of the Causes and Means for Their Reduction.* Reginald Trauttschold. (20) July 4.
- Construction of Machinery Foundations.* Arthur Connley. (20) July 4.
- A New Compensated Testing Brake.* David Robertson. (73) July 5.
- Automatic Stoking in the Boiler House of the Mines de Dourges Company, France.* (22) July 5.
- De Laval Multi-Cellular Type Steam Turbine.* (47) July 5; (64) June 4.
- Silica in Rotary Kiln Portland Cement. Otto Dorman. (From *Zeitschrift für Angewandte Chemie und Centralblatt für Technische Chemie*.) (11) July 5.
- The Royal Agricultural Show.* (12) Serial beginning July 5.
- The High Pressure Distribution System.* J. B. Hirst. (Paper read before the Illinois Gas Assoc.) (24) July 8; (83) June 1.
- Coal and Ash Handling at Sioux City.* (64) July 9.
- Oil Engines. (Report of Prime Movers Committee, National Elec. Light Assoc.) (64) July 9.
- Heating by Radiation.* M. Lucien Bertin. (Abstract of paper read before the Société Technique du Gaz.) (66) July 9.
- Some Notes on Band Conveyors. F. Tissington. (96) Serial beginning July 11.
- Rolling High-Speed Tool Steel Bars.* (20) July 11.
- An Automatic Chain Welding Machine.* (20) July 11.
- Natural Draft Gas Furnaces.* E. P. Taudevin. (Paper read before the Glasgow and West of Scotland Technical Inst.) (22) July 12.
- Electrically-Driven Rolling Mills of the Cambria Steel Company, U. S. A.* (From the *Iron Trade Review*.) (22) July 12.
- Keeping Modern Water Heaters in Repair.* (101) July 12.
- The Firing of Bunker Coal and Coal Cargoes. (11) July 12.
- Remodeling the Power Plant of a Paper Mill. S. A. Staeger. (14) July 13.
- Liquid Purification of Illuminating Gas. Clarence A. Schnerr. (Paper read before the Illinois Gas Assoc.) (24) July 15; (83) June 1.
- Meter and Meter Repairs. Charles Leech. (Paper read before the Southern Gas Assoc.) (24) July 15.
- Molding Sand Tests; Results of Two Years' Labor, Under Auspices of Foundrymen's Association. R. Moldenke. (62) July 15.
- Good Economy in a Gas Power Ice-Making Plant.* C. A. Tupper. (64) July 16.
- Some Notes on High-Pressure Lighting.* A. M. I. Cleland. (Paper read before the Irish Assoc. of Gas Managers.) (66) July 16.
- Construction and Working of a Small Sulphate of Ammonia Plant. T. Hornby. (Paper read before the Irish Assoc. of Gas Mgrs.) (66) July 16.
- Cost of Moving Earth by Dump Wagons Loaded Through a Trap by Fresno Scrapers.* W. A. Gillette. (86) July 17.
- Bleeding Steam from Receivers of Triple Expansion Engines for Heating Feed Water.* Geo. M. Peek. (13) July 18.
- Mannesmann Seamless Steel Joint Tubes.* Fritz Seel. (Paper read before the Track Superintendents' Soc. of R. R. in the Cassel district, Germany.) (From *Wochenschrift für Deutsche Bahnmeister*.) (20) July 18.
- Dust Explosions in Factories.* W. S. Smith. (From *Annual Report*, Chief Inspector of Factories.) (47) July 19.
- Brick Drying. H. C. Russell. (Paper read before the Am. Soc. of Heating and Ventilating Engrs.) (101) July 19.
- The Boiler-House Plant of the Royal Liver Buildings, Liverpool.* (12) July 19.
- Valve Gear Diagrams and the Apparatus for Drawing Them.* W. E. Dalby. (12) Serial beginning July 19.
- Duchesse's Experiments on Superheat.* V. Dweishauvers-Dery. (64) July 23.
- American Practice in Rating Internal Combustion Engines.* T. C. Ulbricht and C. E. Torrance, Jr. (64) July 23.
- Low-Cost Testing-Machines for Concrete Beams and Slabs.* Ernest McCullough.* (13) July 25.
- Thomas Spacing Table for Multiple Punches.* (15) July 26.
- Means for Accumulating Refrigeration. Charles H. Herter. (64) Serial beginning July 30.
- Safeguarding Grinding Wheels.* F. B. Jacobs. (20) Aug. 1.
- Transmission par Friction à Rapport de Vitesses Variable.* P. Raes. (31) Pt. 2.

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Mechanical—(Continued).

- Résultats et Interprétation d'Essais de Moteurs d'Aviation, Conditions d'Adaptation des Moteurs sur les Aéroplanes.* G. Lumet. (32) Jan.
- La Fabrication du Sucre de Betteraves; Son Histoire depuis Cent Ans; Son Etat Actuel. A. Gilbert. (32) Mar.
- Cornues Verticales à Distillation Continue Système Woodall et Duckham, Usine à Gaz de Lausanne.* E. Lemaire. (33) Mar. 23.
- Pompe à Air pour Condenseur; Système Thyssen-Pfeiderer.* (34) Apr.
- Traineau-Automobile.* René le Grain. (92) Apr.
- Quelques Renseignements Pratiques sur l'Aviation.* Robert Esnault-Pelterie. (32) Apr.
- Sur la Régularité et les Régulateurs des Moteurs à Vapeur ou à Gaz.* Ch. Relgnier. (37) Apr. 30.
- Etudes Experimentales de Technologie Industrielle: Le Clou. Ch. Frémont. (92) Serial beginning May.
- Contribution Expérimentale à l'Aérodynamique du Cylindre et à l'Etude du Phénomène de Magnus. Lafay. (37) May.
- La Turbine à Vapeur à Réaction, Système Ljungström.* (33) May 18.
- Trileur-Classeur pour Matières Diverses; Système Ch. Roesin et J. Richard.* L. Pierre-Guédon. (33) May 18.
- Bombe Calorimétrique Thermo-Electrique à Lecture Directe pour les Usages Industriels, Système Ch. Fréry.* Ch. Fréry. (33) May 25.
- L'Amélioration du Rendement des Turbines à Vapeur par l'Emploi des "Disques d'Echappement."* Delaporte. (37) June.
- Note sur les Turbines à Vapeur. A. R. Garnier. (37) June.
- Remarques sur la Théorie des Turbo-Machines.* R. Tison. (37) June.
- La Circulation de l'Eau dans les Chaudières.* M. Emanaud. (34) Serial beginning June.
- Tracteur à Quatre Roues Motrices et Directrices; Système Panhard.* D. Renaud. (33) June 8.
- Le Chauffage, au Gaz de Gazogène, des Ateliers des Chemins de Fer Prussiens, à Deltzsch.* (33) June 15.
- Transformateur de Vitesse; Système Hydro-Dynamique de Föttinger (Breveté).* (34) July.
- Schieber oder Ventil.* Ernst Claassen. (48) Mar. 23.
- Untersuchung einer Abdampfturbinenanlage von 1000 K.W. auf der Zeche Neuiserlohn II der Harpener Bergbau-Akt.-Ges., Dortmund.* Schulte. (48) Mar. 30.
- Bericht über die Untersuchung einer Torfgasanlage der Görlitzer Maschinenbauanstalt und Eisengießerei A. G.* H. Baer. (48) Serial beginning Apr. 6.
- Hydraulischer Antrieb für Motorwagen.* A. Heller. (48) April 13.
- Die neuere Entwicklung der Fördermaschinenantriebe und der Sicherheitsvorrichtungen.* Wallfisch. (48) Apr. 13.
- Ungewöhnliche Drahtseilbahnen.* Georg v. Hanffstengel. (48) Serial beginning Apr. 20.
- Versuche mit Selbstgreifern.* Kammerer. (48) Apr. 20.
- Die neuere Entwicklung der Luftschiffe, Flugmaschinen und Luftfahrzeugmotoren in Frankreich und die dritte Internationale Luftfahrt-Ausstellung in Paris vom 16 Dezember 1911 bis 2 Januar 1912.* F. Bendemann. (48) Serial beginning Apr. 20.
- Eine Drahtseilbahnanlage mit ungewöhnlichen Abmessungen.* (102) May 1.
- Neuere Glessbetrkrane.* F. Heym. (50) May 2.
- Bericht über die Rundfrage betreffend Verwendung von Gaskoks. Berlitt. (7) May 4.
- Teerölverwertung für Heiz-Kraftwerke.* R. Hausenfelder. (50) May 9.
- Die Theorie der Materialwanderung beim Walzen und Schneiden.* Adolf Falk. (50) Serial beginning May 16.
- Die Verwertung der heissen Abgase von Flammöfen zur Dampferzeugung. F. Peter. (30) Serial beginning May 16.
- Der Nutzeffekt von Warmwasserbereitungs-Anlagen.* G. de Grahl. (7) May 18.
- Spelnewasservorwärmer hinter Hochofengas- und Abhitze-Kesseln.* Franz Carl W. Gaab. (50) May 23.
- Eine Drahtseilbahnanlage von ungewöhnlichen Abmessungen.* (53) May 31.
- Moderne Hochdruckkompressoren. Kl. Karger. (53) Serial beginning June 28.
- Eine Dieselanlage für Walzwerkbetrieb. H. Baudisch. (53) July 12.

Metallurgical.

- Lead-Smelting in the Ore-Hearth. J. J. Brown, Jr. (56) Vol. 42.
- Assay of Silver-Bearing Gouge-Ores. Charles R. Keyes and D. F. Riddell. (56) Vol. 42.
- Diagonal-Plane Concentrating Table.* S. Arthur Krom. (56) Vol. 42.
- Electrolytic Refining at the U. S. Mint, San Francisco, Cal.* Edward B. Durham. (56) Vol. 42.
- Treatment of Nicaraguan Gold-Ores. Henry B. Kaeding. (56) Vol. 42.

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Metallurgical—(Continued).

- The Continuous System of Cyaniding in Pachuca Tanks.* Huntington Adams. (56) Vol. 42.
- Notes on Huntington Mills in Nicaragua.* Clarence Carleton Semple. (56) Vol. 42.
- The Sintering of Fine Iron-Bearing Materials.* James Gayley. (56) Vol. 42.
- The Fuel-Efficiency of the Iron Blast-Furnace.* John Jermain Porter. (56) Vol. 42.
- Rapid Estimation of Available Calcium Oxide in Lime Used in the Cyanide Process. Luther W. Bahney. (56) Vol. 42.
- Electrolytic Oxygen in Cyanide Solutions. T. H. Aldrich, Jr. (56) Vol. 42.
- Slime-Filtration.* George J. Young. (56) Vol. 42.
- The Cyanide-Plant at the Treadwell Mines, Alaska.* W. P. Lass. (56) Vol. 42.
- The Parral-Tank System of Slime-Agitation.* Bernard Macdonald. (56) Vol. 42.
- Vacuum Furnace Metallurgy. Colin G. Fink. (Paper read before the Am. Electrochemical Soc.) (105) May.
- Tensile Strength of Electrolytic Copper.* C. W. Bennett. (Paper read before the Am. Electrochemical Soc.) (105) May.
- The Experimental Ore Dressing and Metallurgical Plant of the Colorado School of Mines. Victor C. Alderson. (105) May.
- Magnetic Separation of Zinc-Iron Ores as Found in Southwestern Wisconsin.* Otto E. Ruhoff. (105) May.
- The Electric Zinc Smelting Furnace.* Charles F. Johnson. (105) May.
- Goldfield, Nev., Cyanide Mill.* (45) May.
- Continuous Melting and Permanent Molds.* R. Hastings Probert. (108) May.
- An Improved Method of Drying Air for Blast Furnaces.* Bruce Walter. (58) May.
- Furnace Electrodes Practically Considered. R. Turnbull. (Paper read before the Am. Electrochemical Soc.) (96) May 2.
- Experiments on Heat Insulation.* (For electric furnaces.) F. A. J. FitzGerald. (Paper read before the Am. Electrochemical Soc.) (96) May 2.
- Thlogen Process Demonstration.* L. H. Eddy. (16) May 4.
- The Pioneer Smelter, Arizona.* A. L. Waters. (16) May 4.
- Gas Circulation in Electrical Reduction Furnaces. Jos. W. Richards. (Paper read before the Am. Electrochemical Soc.) (96) May 9.
- Steel and Its Heat Treatment. Robert R. Abbott. (Abstracts from paper read before the Cleveland Eng. Soc.) (20) May 9.
- Inland Steel Company's New Blast Furnace.* (20) May 9.
- Determining Carbon in Iron and Steel.* F. W. Robinson. (Paper read before the Am. Electrochemical Soc.) (20) May 9.
- Process for Separating Blende and Barite.* F. C. Bryant. (16) May 11.
- Tests of Zinc Dust for Cyaniding.* W. J. Sharwood. (16) May 11; (103) May 11.
- Tests on Compressed Steel Ingots. (13) May 16.
- Asphyxiation by Blast-Furnace Gases.* A. Breyer. (From *Annales des Mines de Belgique*.) (22) May 17.
- Recent Developments in Steel-Works Practice.* B. W. Head. (Paper read before the West of Scotland Iron and Steel Inst.) (22) Serial beginning May 17.
- Recent Progress in Electrical Iron Smelting in Sweden.* T. D. Robertson. (Abstract of paper read before the Am. Electrochemical Soc.) (73) May 17.
- Metallurgical Developments in Iron and Steel. John S. Unger. (Paper read before the Am. Iron and Steel Inst.) (20) May 23.
- The Way-Arbuckle Process at Benoni.* (103) May 25.
- A New Slime Density Table. H. B. Lowden. (105) June.
- The Electric Furnace as a Possible Means of Producing an Improved Quality of Steel. William R. Walker. (Paper read before the Am. Iron and Steel Inst.) (105) June; (20) May 23.
- A Shaking Inclined-Screen Hydraulic Classifier. Lewis B. Skinner. (Abstract of paper read before the Colorado Scientific Soc.) (105) June.
- The Concentration of Carnotite Ores, and Some Similar Ores.* Siegfried Fischer. (105) Serial beginning June.
- Copper Determinations at Granby. Frank E. Lathe. (16) June 1.
- Refractory Manganese-Silver Ores. Will H. Coghill. (103) Serial beginning June 1.
- Vanadium in Iron and Steel Castings. G. L. Norris. (Abstract of paper read before the Am. Foundrymen's Assoc.) (13) June 6.
- Small Concentrating Mills in the Wisconsin Zinc District.* W. F. Boericke. (103) June 15.
- Copper Smelting at Kyshtim.* Ernest J. Carlyle. (16) June 22.
- Electric Furnace Steel for Rails. W. R. Walker. (13) June 27.
- Copper Smelting at Kyshtim. V. P. Assaieff. (Translated from *Gorny Journal*.) (103) June 29.
- Flotation of Zinc Ores in Japan. Tadashi Inouye. (103) June 29.
- The Parks Electro-Cyanide Process.* John R. Parks. (6) July.
- A New Method of Dressing Cornish Tin Ores.* Marcus Ruthenburg. (105) July.

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Metallurgical—(Continued).

- The Chemical and Physical Reactions in a Zinc Retort. F. L. Clerc. (105) Serial beginning July.
- Variation of the Electrical Resistance of Oxides with Temperature.* A. A. Somerville. (105) July.
- A Centrifugal Gas Washer Purification and Cooling of Blast-Furnace and Producer Gases. Walther Feld. (105) July.
- Steel and Its Heat Treatment. Robert R. Abbott. (Abstract of paper read before the Cleveland Eng. Soc.) (47) July 5.
- The Electric Smelting of Zinc Ore. W. R. Ingalls. (Paper read before the Canadian Min. Inst.) (16) July 6.
- Renoni Mine and Mill on the Rand.* H. S. Gieser. (16) July 6.
- Mud Disposal in Blast Furnace Gas Purification.* Alfred Gradenwitz. (16) July 6.
- Flotation of Minerals.* Kenneth A. Mickle. (Abstract of paper read before the Royal Soc. of Victoria.) (103) July 6; (16) July 13.
- Veta Colorado Mill and Cyanidation Plant.* Bernard MacDonald. (103) Serial beginning July 6.
- Shaking Amalgamation Tables for Tube Mill Circuit.* (16) July 13.
- A New Dry Blast Process for Iron Furnaces.* John B. Miles. (47) July 19.
- Cyanidation of Pyritic Ore.* F. B. Reece. (103) July 20.
- Acme Graphite Mines and Mills.* H. M. Beattie. (16) July 20.
- Problems of the Factory Metallurgist.* William D. Mainwaring. (Paper read before the Soc. of Detroit Chemists.) (20) July 25.
- The Pennsylvania Smelting Company Plant.* S. L. Goodale and H. C. Ray. (103) July 27.
- The Associated Mill, Manhattan.* J. C. Kennedy. (103) July 27.
- West End Consolidated Mill, Tonopah.* J. P. Hart and H. L. Williams. (16) July 27.
- Lime in Cyanidation. J. W. Hutchinson. (16) July 27.
- The New Port Henry Blast Furnace.* Frank C. Roberts. (20) Aug.
- On the Simultaneous Electrolytic Deposition of Copper and Zinc from Various Solutions Not Containing Cyanide. M. de Kay Thompson. (105) Aug.
- La Fabrication du Ferrosilicium à Haute Teneur au Four Electrique.* Waldemar Pick et Walter Conrad. (93) May.
- Sur la Cristallisation et Structure des Aciers Refroidis Lentement.* N. T. Belaiew. (93) May.
- Sur la Cémentation du Fer par le Carbone Solide.* G. Charpy et S. Bonnerot. (93) May.
- Variations Sonores des Aciers en Fonction de Leur Temperature. Félix Robin. (93) June.
- Sur un Nouveau Procédé de Coulée des Lingots d'Acier.* J. Corbiau. (93) July.
- Maschinenwirtschaft in Hüttenwerken.* H. Hoffmann. (48) Serial beginning Mar. 16.
- Die Theorie des Schweißens von Stahl und ihre praktische Anwendung.* Max Bermann. (48) Mar. 30.
- Beispiele ausgeführter Querschnittsformen für Hüttenwerksgebäude.* W. Schömburg. (69) May.
- Ueber das Trockenverzinken oder Sherardisieren. Ernst Bernheim. (50) May 23.
- Die Bedeutung des Glühens von Stahlformguss.* P. Oberhoffer. (From a Paper read before the deutsche Giessereifachleute.) (Reports of the eisenhüttenmännische Institut der Kgl. Technischen Hochschule Breslau.) (50) May 30.
- Die Bewegung der Gase in den hüttentechnischen Oefen. A. Roltzheim. (50) Serial beginning June 13.
- Tabellen-Buchführung in Hüttenbetrieben. A. Waink. (Paper read before the Eisenhütte Südwest.) (50) June 13.

Military.

- Coast-Defenses of the United States. The System of Range-Finding by which the Great Accuracy of Coast-Defense Gun-Fire is Secured.* (46) May 18.
- Guns of the Coast-Defense.* (46) May 18.
- A New Type of Powerful Mortar, the Krupp Eleven-inch Howitzer and Portable Carriage.* (46) July 6.

Mining.

- Overwinding-Prevention and Controlling Gear for Colliery Winding-Engines, with a Description of the Inglis Controller.* James Black. (106) Vol. 43, Pt. 2.
- The Prevention of Explosions in Mines.* John Harger. (106) Vol. 43, Pt. 2.
- The Lancashire Electric Power Company's System, and Its Application to Lancashire Collieries.* Charles D. Talte. (106) Vol. 43, Pt. 2.
- The Use of X Rays in the Examination of Coal. F. C. Garrett and R. C. Burton. (Paper read before the North of England Inst. of Min. and Mech. Engrs.) (106) Vol. 43, Pt. 3.

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- Modern Ventilating Machines.* W. Charlton. (Paper read before the South Staffordshire and Warwickshire Inst. of Min. Engrs.) (106) Vol. 43, Pt. 3.
 Experiences on a Chinese Coal-Field.* George S. Caldwell. (Paper read before the Manchester Geol. and Min. Soc.) (106) Vol. 43, Pt. 3.
 Chamber-Pillars in Deep Anthracite-Mines.* Douglas Bunting. (56) Vol. 42.
 Mine Caves under the City of Scranton.* Eli T. Conner. (56) Vol. 42.
 Examination of Dredging-Properties. Francis J. Dennis. (56) Vol. 42.
 Present-Day Problems in California Gold-Dredging.* Charles Janin. (56) Vol. 42.
 Electric Motors Versus Compressed-Air Engines for Driving Deep-Mine Hoists.* K. A. Pauly. (56) Vol. 42.
 Mine-Rescue Service of the State of Illinois.* H. H. Stock. (56) Vol. 42.
 The Caddo Oil and Gas Field, Louisiana.* Walter E. Hopper. (56) Vol. 42.
 The Newport Iron-Mine.* B. W. Vallat. (56) Vol. 42.
 Notes on the Liberty Bell Mine.* Charles A. Chase. (56) Vol. 42.
 Exploration of Cuban Iron-Ore Deposits.* Dwight E. Woodbridge. (56) Vol. 42.
 The Mayari Iron-Mines, Oriente Province, Island of Cuba, as Developed by the Spanish-American Iron Co.* James E. Little. (56) Vol. 42.
 The Preparation of Brown Iron-Ores. H. S. Geismar. (56) Vol. 42.
 Mining-Costs at Park City, Utah. Fred T. Williams. (56) Vol. 42.
 Shaft Sinking by Electric Sinking Hoists. (From the *South African Mining Journal*) (45) May; (86) May 15.
 The Jed, W. Va., Mine Explosion.* (45) May.
 Does it Pay the Average Coal Mine to Purchase Central Station Power? Graham Bright. (42) May.
 Mine Explosion at McCurtain, Okla.* A. A. Steel. (45) May.
 Bruceston, Pa., Explosion: A Description of the Explosion Test at the Experimental Mine, on Feb. 24th, 1912. George S. Rice. (45) May.
 Deep Coal Mine Shafts. (45) May.
 Panther Creek Drainage Tunnels.* (45) May.
 Square-Set Mining at Vulcan Mines.* (45) May.
 Mining Switchgear.* (22) May 3.
 The Jamage Pit Disaster: Chief Inspector's Report.* (22) May 3.
 Steel for California Dredges. Al. H. Martin. (68) May 4.
 Air Driven Side Dump Car.* S. A. Worcester. (16) May 11.
 A Safe Way of Storing Inflammable Liquids.* Jacques Boyer. (46) May 11.
 Experimental Coal-Washing Plant at McGill Univ.* J. B. Porter. (Abstract of Report to Dominion Govt.) (57) May 17.
 Dredges on Upper American River.* Lewis H. Eddy. (16) May 18.
 Bell Signaling and Cable Systems in Shafts at the Crown Mines, Limited.* (103) May 18.
 Joplin Jigging Practice.* Claude T. Rice. (16) May 18.
 Mine Hoisting Systems Compared. Bruno V. Nordberg. (16) Serial beginning May 18.
 Methods of Constructing and Placing Reinforced Concrete Sets in Mining Shafts for The Ahmeek Mining Co., Michigan. E. R. Jones. (Abstract from paper read before the Michigan Coll. of Mines Club.) (86) May 22.
 Developments at Cortonwood Colliery.* (22) May 24.
 Cost of Mining a Ton of Ore. Heath Steele. (16) May 25.
 Breaking Ground Without Powder. G. E. Wolcott. (16) May 25.
 Lining a Tunnel in Swelling Rock, a Description of the Methods used on the Snake Creek Tunnel in Utah.* Guy R. McKay. (14) May 25.
 Placer Mining in the Province of Quebec. H. A. Ball. (103) May 25.
 The Osaruzawa Mine.* Takeshi Kawamura. (103) May 25.
 Hydrauliclicking in Beauce County, Que.* Fritz Cirkel. (16) June 1.
 Explosives in Coal Mines Order. (22) June 7.
 Use of Gasoline Motors in Coal Mines. J. A. King. (Abstract of paper read before the West Virginia Min. Inst.) (62) June 10.
 Lubrication in Coal Mining Practice. L. A. Christian. (Paper read before the West Virginia Min. Inst.) (62) June 10.
 Method of Sinking 233 ft. of 10 x 45 ft. Shaft in One Month, a South African Shaft Sinking Record. A. Cooper-Key. (From *Mining and Engineering World*.) (86) June 12.
 A Cripple Creek Ore and Waste Plant.* S. A. Worcester. (16) June 15.
 The Sublevel Stopping Method.* F. W. Sperr. (16) June 15.
 The Oilfields of Galicia (Austria). V. Kravani. (68) June 15.
 Prospecting Frozen Ground. Leon Perret. (Abstract from a paper read before the Inst. Min. and Metallurgy.) (103) June 22.
 Mine Accidents and Their Prevention. Ed. Ryan. (Paper read before the Engrs. Club, Mackay School of Mines.) (103) June 22.
 Joplin Ore Bin Construction.* (16) June 22.
 Closing a Spouting Oil Well.* (13) June 27.
 Electrical Installations of the Lena Gold Mining Company.* (From *Elektritchestvo*.) (68) June 29.

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- Sampling and Valuation of Ores. A. Rzehulka. (From *Montanistische Rundschau*.) (68) June 29.
- Aerial Ropeway at the Blaydon Burn Pits of the Priestman Collieries, Limited.* (22) June 28.
- Mineral Hill, Nevada. R. H. Toll. (103) June 29.
- Lining the Snake Creek Tunnel.* Oscar N. Friendly. (16) June 29.
- Mine Sampling and Valuation. H. S. Munroe. (Paper read before the Min. and Metallurgical Soc. of America.) (16) June 29.
- The Sizing of Fine Dry Ore.* Charles H. Brown. (16) June 29.
- Top Slicing at the Caspian Mine. Wm. A. McEachern. (Paper read before the Lake Superior Min. Inst.) (45) July, 1912.
- Timbering a Small Shaft.* John T. Fuller. (45) July, 1912.
- Transvaal Gold Mining, Present and Future Methods.* F. H. Hatch. (9) July.
- Electric Mining Applications.* E. A. Lof. (6) July.
- The Direct Driving of Mining Plant by Internal-Combustion Engines.* A. Vennell Coster. (10) July.
- Methods of Taking a Number of Cores from One Diamond Drill Hole and of Surveying the Boreholes.* (86) July 3.
- Dortmund Washery at the Holbrook Colliery.* (22) July 5.
- Improved Ferro-Concrete Shaft Lining (Collieries).* C. Menskens. (From *Deutsche Bergwerks-Zeitung*.) (22) July 5.
- Cost of Diamond Drill Equipment. Heath Steele. (16) July 13.
- Dry Concentration of Placer Gold.* F. J. H. Merrill. (103) July 13.
- Churn-Drilling in Shaft-Sinking. Tom McCormac. (103) July 13.
- Electric Mine Locomotive Operation. A. F. Elliott. (16) July 13.
- Reinforced Concrete in Mine Shafts.* E. R. Jones. (Abstract of a paper read before the Michigan College of Mines.) (16) July 13.
- Notes on the Analyses of Mine Air Conducted at the Lewis Merthyr Consolidated Collieries, Limited, Trehafod. J. W. Hutchinson and Edgar C. Evans. (Paper read before the South Wales Inst. of Engrs.) (57) July 19.
- The Profile Controller and Overwind Preventer.* (57) July 19.
- Estimating Percentages of Firedamp with the Safety Lamp. (22) July 19.
- The Electrically Operated Loftus Ironstone Mine.* (19) July 20.
- Falls of Ground in Mines. James Chilton. (Abstract of paper read before the Chemical, Metallurgical and Min. Soc. of South Africa.) (16) July 20.
- Silver Mining at Cobalt, Ontario.* Reginald E. Hore. (103) July 20.
- Copper Mining at Lake Superior. Claude F. Rice. (16) Serial beginning July 20.
- Methods of Making a 350 000 Cu. Yd. Blast at Piedra, California.* (86) July 24.
- Closing a Gas Well in Hungary.* A. Strohl. (Abstract of paper read before the Soc. of Hungarian Engineers and Architects of America.) (16) July 27.
- La Commande Electrique des Machines d'Extraction par Moteur Continu avec Rélage Léonard, ou par Moteur Monophasé à Double Collecteur.* (33) Apr. 27.
- Presse Hydraulique pour Cintres les Chapeaux de Boisage des Galeries de Mines.* (34) June.
- Beton- und Eisenbeton-Arbeiten über und unter Tage auf der Kohlengrube Alma.* W. Meurer. (51) Sup. No. 13.
- Die Berechnung der Fördergerüste.* R. Blumenfeld. (69) Jan.
- Magnetische Anreicherung von Ural-Erzen in Herräng (Schweden).* (50) May 16.

Miscellaneous.

- The Cost of Rock Excavation in Open Cutting. (12) Serial beginning April 26.
- Ozone: Its Properties and Commercial Production.* Milton W. Franklin. (42) May.
- Power Plant Recording System.* L. R. W. Allison. (64) May 7.
- Overhead Charges. Mortimer E. Cooley. (Abstract of paper read before the Am. Elec. Ry. Accountants' Assoc.) (96) May 9.
- Presenting Assay Results by Graphic Methods.* J. B. Stewart. (103) May 11.
- The Manufacture of Nitrates from the Atmosphere.* Ernest Kilburn Scott. (27) May 17.
- The German Patent System. H. Wertheimer. (27) May 18.
- The Imperial College of Science and Technology.* C. A. M. Smith. (11) Serial beginning May 24.
- The Installation and Use of Pyrometers in Steel Mills. C. S. Gordon. (105) June.
- Arbitration. Onward Bates, M. Am. Soc. C. E. (4) June.
- The Engineering Graduate and the World. Charles H. Benjamin. (13) June 6.
- The Use of Charts in the Preparation of Estimates.* Edward G. Fiegehen. (11) June 14.
- The New Eight-hour Law. George A. King. (14) June 15.
- Notes on Comparative Cost of Horse and Motor Truck Transportation in Engineering and Contracting Work. Rollin W. Hutchinson, Jr. (86) June 19; (20) June 20.

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Miscellaneous—(Continued).

- Some Business Forms Used in an Engineering Office.* C. N. Bennett. (13) June 20.
- Technical Information Bureaus. Louise B. Krause. (14) June 22.
- Development Cost or "Going Value" of Public Service Companies. Halbert P. Gillette. (Paper read before the Washington Public Service Comm.) (86) June 26.
- Symphony in Stereoscopic Radiography.* P. H. Eijkman. (3) July.
- Simplifying Some Engineering Calculations. Carl Hering. (13) July 11.
- The Organization for and Methods and Results of Physical Valuation in Nebraska. E. C. Hurd. (86) July 31.
- Practical Comparison of Distribution Curves (so-called candle-power).* R. F. Pierce. (83) Aug. 1.
- Les Anciennes Charrues d'Europe.* H. Chevallier. (32) Jan.
- La Science Pure Orientée vers les Applications et la Science Industrielle: La Réduction de l'Oxyde de Fer et les Gazogènes. Henry Le Chatelier.* (93) July.
- Das Ähnlichkeitsgesetz bei Reibungsvorgängen.* H. Blasius. (48) Apr. 20.
- Municipal.**
- The Main Levelling of Copenhagen, 1907-8. C. F. V. Boock. (104) Apr. 26.
- Highway Maintenance. Robert D. Kneale. (Paper read before the Montana Soc. of Engrs.) (1) May.
- Light-Traffic Pavements for Boulevards, Residence Streets and Highways. Linn White. (4) May.
- The Contractors' Side of Road Building. D. L. Hough. (Paper read before the Am. Assoc. for Highway Improvement.) (60) May.
- Practical Road Building.* John N. Edy. (60) Serial beginning May.
- The Testing of Wood Paving Blocks. F. Kleeberg. (60) May.
- Stone and Gravel Roads. W. A. McLean. (Paper read before the Am. Road Bldrs. Assoc.) (60) May.
- An Efficient Method of Handling Concrete for Street Paving Bases.* (96) May 2.
- A Motor-Driven Pneumatic Street Cleaning Machine.* (13) May 2.
- Parking a City Street for Railway Tracks.* (17) May 4.
- Hydraulic Excavation Methods in Seattle. Detailed Construction Records of some Features of the Jackson Street Regrade.* R. M. Overstreet. (14) May 4.
- Concrete Pavements in Davenport. A. M. Compton. (Paper read before the Iowa Eng. Soc.) (14) May 4.
- Highway Bridges and Culverts.* Chas. H. Hoyt and William H. Burr. (Abstracts from *Bulletin*, U. S. Office of Good-Roads.) (96) May 9.
- Mass and Bulk in Highway Engineering.* (104) May 10.
- Hydraulic Regrading in Portland, Ore.* (13) May 16; (14) May 11.
- Methods and Cost of Constructing a 3-In. Creosoted Wood Block Pavement at Longview, Tex. P. E. Green, Assoc. M. Am. Soc. C. E. (86) May 15.
- Bituminous Macadam Sidewalks for the Development of Suburban Properties.* W. G. Stone. (From *Monthly Journal*, Engrs. Club of Baltimore.) (86) May 15.
- Some Standards of the New York State Highway Department for Brick Paved Roads.* (86) May 15.
- Methods and Cost of Constructing Concrete Combined Curb and Gutter and Concrete Sidewalks.* E. W. Robinson. (86) May 15.
- An English Specification for the Construction of Wood Block Pavement. Clifford Richardson, M. Am. Soc. C. E. (86) May 29.
- A Review of the Use of Bituminous Materials in the Construction and Maintenance of Highways in 1911. Arthur H. Blanchard, M. Am. Soc. C. E. (Paper read before the Am. Assoc. for the Advancement of Science.) (86) May 20; (60) June; (13) June 6.
- Portland Cement Concrete Roads. Logan Waller Page. (Paper read before the Am. Assoc. of Portland Cement Mfrs.) (14) May 25; (86) June 12.
- Motor Car Traffic and Main Road Crusts. (104) May 24.
- Some Costs of Gravel and Macadam County Aid Roads Built in Wisconsin in 1911. (86) May 22.
- Some Sidelights on Road Construction Questions, with Particular Reference to Bituminous Road Building. Harry Tipper. (98) June.
- Heavy-Duty Crushing Rolls (for Roads).* S. W. Traylor. (105) June.
- Comparison of Cincinnati Pavements. (60) June.
- Construction of Asphalt Macadam in Webb City, Mo. E. W. Robinson. (60) June; (86) June 12.
- Crown of Paved Streets.* S. Whinery. (13) June 6.
- How City Planning Bills Are To Be Paid. Nelson P. Lewis. (Paper presented to 4 National Conferences on City Planning.) (13) June 13; (14) June 8.
- An Improved Concrete Pavement.* E. W. Groves. (96) June 13.
- Concrete Roads in Michigan Fail.* W. P. Blair. (76) June 15.
- The Fault in Paving Brick. (76) June 15.
- Cost of Pavements in Conneaut, Ohio. (76) June 15.
- The Concrete Roads of Wayne County, Michigan. Geo. A. Dingman. (86) June 19.

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- The Life of Brick Pavements. (86) June 19.
 Public Roads of New Jersey, U. S. A.* E. A. James. (96) June 20.
 Highway Construction in the State of Washington by Convict Labor.* Frank A. Kittredge. (86) June 26.
 Steam Road-Roller Fitted with Superheater and Feed-Heater.* (11) June 28.
 The So-Called Topeka Surface for Highways. Clifford Richardson. (14) June 29.
 Paying for Pavements in Utica. George C. Warren. (14) June 29.
 State Highway Construction and Maintenance in Massachusetts. Arthur W. Dean. (Paper read before the Boston Soc. C. E.) (1) July.
 Development and Increase in the Use of Asphaltum. Harry Larkin. (Paper read before the Technical Soc. of the Pacific Coast.) (1) July.
 Louisville Adopts Brick Pavements.* G. D. Crain. (76) July 1.
 Some Costs of Macadam and Gravel Road Construction in Missouri. (86) July 3.
 Some Details and Specifications of the California Highway Commission.* (86) July 3.
 Design for the New Capital City of Australia.* (13) July 4.
 The Pittsburgh Hump Regrade.* (13) July 4.
 Concrete Pavements—History and Summary of Practice. K. H. Talbot. (Paper read before the Iowa Eng. Soc.) (86) July 10.
 Some Municipal Works at Stowbridge.* F. Woodward. (Paper read before the Inst. of Mun. and County Engrs.) (104) July 12.
 A Novel Use for Water Gas Tar. (83) July 15.
 Cost of Repairing Sheet Asphalt Pavement in Brooklyn, N. Y.* (86) July 17.
 The New Specifications of the Board of Local Improvements of Chicago, Ill., for Cresote Wood Block Pavement. (86) July 17.
 The Experimental Pavements on Hillside Ave., Queens Borough, New York City. (86) July 24.
 Some English Directions for Surfacing an Existing Road with Steam Rolled Water-Bound Macadam. (Eng. Committee Road Board of G. B.) (86) July 24.
 Two Specific Examples of the Value of Motor Trucks in Road Construction.* Rollin W. Hutchinson, Jr. (86) July 31.
 L'Art de la Construction et de l'Embellissement des Villes, l'Exposition et le Congrès de Londres (Town Planning Conference). Paul Deheem. (30) June.
 Concasseur à Macadam: Système J.-B. Aillot (Breveté).* (34) June.
 Sandstreummaschinen für vereiste Bürgersteige und Strassen: Streupflicht der Gemeinden oder der Anlieger.* (7) Mar. 30.
 Asphalt block-Pflastersteine. Karl G. Haupt. (39) Apr. 5.
 Zur Freilassung des Theater-Platzes in Dresden.* Albert Hofmann. (51) Serial beginning June 19.

Railroads.

- Tunnel-Driving in the Alps.* (56) Vol. 42.
 Electric Traction in Switzerland.* E. Huber-Stockar. (75) July, 1911.
 Rack-Railway Locomotives of the Swiss Mountain Railways. J. Weber and S. Abt. (75) July, 1911.
 Oil-Burning Locomotives on the Tehuantepec National Railroad, Mexico.* R. Godfrey Aston. (75) Oct.
 Special Appliances for Railway Shops.* Gust Gstoettner. (Paper read before the Am. Ry. Tool Foremen's Assoc.) (108) Apr.
 Single-Phase Locomotives for the Prussian State Railways.* (12) April 26.
 Corrugation of Rails.* J. H. Briggs. (73) Serial beginning Apr. 26.
 Westinghouse Petrol-Electric Car for the Grand Central Railway Co.* (26) Apr. 26.
 Automatic Brake Slack Adjusters for Steam and Electric Cars.* W. H. Sauvage (65) May.
 Studies of Protection and Protective Apparatus for Electric Railways.* E. E. F. Creighton, F. R. Shavor and R. P. Clark. (42) May.
 Freight Train Tests on an Electric Interurban Railway.* S. T. Dodd. (42) May; (17) May 18.
 0-8-0 Superheated Goods Engine; London and North Western Railway.* (21) May.
 Locomotive Speed Indicators and Recorders.* (21) May.
 Locomotive Boiler Washing.* C. E. Lester. (94) May.
 Remarkable Locomotives of 1911.* J. F. Galrns. (10) May; (13) July 11.
 Automobile Car.* (25) May.
 All Steel Electric Suburban Car.* (25) May.
 Highly Superheated Steam (for Locomotives).* Gilbert E. Ryder. (Abstract of paper read before the Southern and Southwestern Ry. Club.) (25) May; (94) June.
 Heavy Freight and Passenger Locomotives.* (25) May.
 Leakage of Locomotive Boiler Tubes. (108) May.
 Intermittent Contact Signal for Electric Railways.* (87) May.
 An Automatic Water Rheostat for Absorbing Excess Coasting Energy in a Three-Phase Railway.* (13) May 2.

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- Cost of Track-Laying on the Erie Railroad. (96) May 2.
 Automatic Signals on the Toronto, Hamilton & Buffalo.* (15) May 3.
 Four-Coupled (4-4-2 Type) Tank Locomotive: North British Railway.* (11) May 3.
 Single-Phase Railways.* (12) Serial beginning May 3.
 Christy Steel Box Car Door.* (15) May 3.
 Large 2-10-2 Type Locomotive Fitted with Superheater and Mechanical Stoker.* (22) May 3; (47) July 12.
 Largest Non-articulated Locomotive.* (15) May 3; (25) May.
 Government Reports on Kimmund and Odessa Collisions. (15) May 3.
 The Great Western Locomotive *Great Bear*.* (12) May 3.
 Study of a Broken Rail on the New Haven.* (15) May 3.
 Grade Separation at Grand Crossing.* (15) May 3.
 Car Shops of the Hocking Valley Ry., Logan, O.* (18) May 4.
 Pacific Type Locomotives for the Chicago & Eastern Illinois R. R.* (18) May 4.
 One Year's Operation of the Dessau-Bitterfeld Line. (Abstract of Report of the Prussian Ministry of Public Works.) (17) May 4; (26) May 24.
 Electric Locomotive for the Omaha, Lincoln & Beatrice Railway Company.* (17) May 4.
 Edison-Beach Cars for Railroad Service.* (18) May 4.
 Proposed Electrification of the Berlin Stadtbahn.* (17) May 4.
 Freight Interchange at Chicago.* (13) May 9.
 Arthur's Pass Tunnel, New Zealand.* W. H. Gavin. (13) May 9.
 The Florida East Coast Extension. Frank M. Patterson. (15) May 10.
 Motor Railway Inspection Car.* (12) May 10.
 The Cambridge Subway.* (17) May 11.
 Spreading of a Railway Embankment on Soft Clay.* (13) May 16.
 The Diesel Locomotive: Reasons for the Slow Adoption of Diesel Engines in the United States.* (13) May 16; (96) June 27.
 The Farrow Spike Machine.* (20) May 16.
 New Locomotive Terminal at Carbondale.* (15) May 17.
 Handling Stone Ballast.* A. M. Clough. (15) May 17.
 Anderson Friction Draft Gear.* (15) May 17.
 Heavy Drainage Work on the Pennsylvania Railroad near Petersburg, Pa.* (15) May 17.
 Locomotive Failures. N. Osgaard. (Abstract of paper read before the Northern Ry. Club.) (22) May 17.
 The Staying of Fire-Boxes.* Robert Weatherburn. (12) Serial beginning May 17.
 Loading Rails with an American Ditcher.* (15) May 17.
 Indian Railways. Neville Priestley. (29) May 17.
 Effect of Titanium on Rail Wear.* (18) May 18.
 Re-Equipment of the Fort Dodge, Des Moines & Southern for 1200-Volt Operation.* (17) May 18.
 Grade Elimination and Bridges.* Henry Grattan Tyrrell. (96) May 23.
 High-Capacity Railway Wagons. Herbert Kelway Bamber. (11) May 24.
 Superheaters and Feed-Water Heaters for Locomotives.* (47) May 24.
 The Use of Anthracite Coal for Locomotive Fuel. T. S. Lloyd. (Extracts from paper read before International Ry. Fuel Assoc.) (18) May 25.
 Dining Cars for the Atchison, Topeka & Santa Fe.* (18) May 25.
 Some Impression of the Electric Traction Situation in Europe. C. E. Eveleth. (42) May; (17) May 28.
 Fuel as a Factor in Locomotive Capacity. W. F. M. Goss. (Paper read before the International Ry. Fuel Assoc.) (18) June 1; (47) June 21; (25) June; (12) May 31.
 Harriman Lines, Spokane-Ayer Cut-off.* (15) May 31.
 Mixtures for Chilled Car Wheels.* "Ironkem." (20) May 16.
 First Series of Tests Between a Stay-Bolt Fire-Box and a Jacobs-Shupert sectional Fire-Box.* W. F. M. Goss. (94) Serial beginning June; (46) July 20; (18) June 1; (47) July 19.
 Electric Steel for Rails. S. T. Wellman. (Paper read before the Am. Iron and Steel Inst.) (105) June.
 The Boston Sleeper Depot. Gt. Northern R.* (21) June.
 The Brown-Mackenzie Cab Signalling System.* (21) June.
 Design for a Sleeper Yard.* J. H. Waterman. (Abstract of paper read before the Wood Preservers' Assoc.) (21) June.
 The Future of Main Line Traction.* (Petrol-electric car, South African Rys.) (21) June; (12) July 5.
 Repairing Locomotive Driving Boxes.* E. T. Spidy. (25) June.
 The Most Powerful Locomotives.* (25) June.
 Self-Clearing Ore Car.* (25) June; (15) June 13.
 The Electrification of Main Line Railroads. William J. Clark. (3) June.
 Concrete Practice. N. Y. C. & H. R. R. R.* (87) Serial beginning June.
 Developments Along Puget Sound; Hydroelectric System of the Puget Sound Traction, Light and Power Company on the Snoqualmie, Puyallup and White Rivers.* (27) June 1.

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Railroads—(Continued).

- Mikado and Pacific Type Locomotives for the Buffalo, Rochester and Pittsburg Ry.* (18) June 1.
- The 1000-Volt D. C. Electrification of the Budapest Local Railways, Hungary.* Julius De Fischer. (17) June 1.
- The New York, Westchester & Boston: Construction of the New York, New Haven & Hartford New High Speed Electric Line.* Gilbert G. Browne. (15) June 7, (18) July 13; (17) July 20; (17) June 15.
- Alcohol Heater Car.* (15) June 7.
- The Chicago Car Door.* (15) June 7.
- Track and Stations of the New York, Westchester & Boston Railway.* (17) June 8.
- Electrical Equipment of the Austrian State Railways.* (27) June 8.
- New Signal Equipment on the Indianapolis & Cincinnati Road.* (17) June 8.
- Ventilating Equipment of the Pennsylvania Tunnels at New York.* B. W. Bennett. (14) June 8; (20) May 23.
- An Interurban Railway Tunnel through the Berkeley Hills.* (14) June 8.
- Construction of the New Lines of the Algoma Central & Hudson Bay Railway.* R. S. McCormick. (14) June 8.
- Determination of Probable Rock Temperature in a Continental Divide Tunnel.* E. Lauchli. (14) June 8.
- The Main Cause of Rail Breakage on American Railways.* Alex. D. Elbers. (62) June 10.
- Composite Gondola Car.* (15) June 12.
- Steel Underframe Tank Car.* (15) June 12.
- Edison Storage Battery for Train Lighting.* (15) June 12.
- Relation of Temperature and Section to Rail Failures. (15) June 14.
- The Euston to Watford Widening (L. & N. W. Ry.).* (12) Serial beginning June 14.
- The Panama Railroad. Percy F. Martin. (12) Serial beginning June 14.
- A New Type of Steel Passenger Car.* (15) June 14.
- Locomotive Terminals on the Chicago & Northwestern Ry.* (18) June 15.
- Mallet Articulated Locomotive for St. Louis, Iron Mountain & Southern Ry.* (18) June 15.
- Proper Method of Firing Locomotives. D. C. Buell. (Extracts from paper read before International Ry. Fuel Assoc.) (18) June 15.
- A 600 Volt-1200 Volt D. C. Freight Locomotive for Oakland, Cal.* (17) June 15; (15) June 20.
- Pacific Type Locomotive, Louisville & Nashville.* (15) June 17.
- Road Tests of Mallet and Consolidation Locomotives. (15) June 18.
- Draft Arrangements on Locomotives.* H. B. MacFarland. (Abstract of paper read at annual meeting of International Ry. Fuel Assoc.) (13) June 20; (18) June 8.
- Fuel Economy on Railways. (13) June 20.
- Increasing the Power Capacity of Locomotives. W. F. M. Goss. (Abstract of paper presented at annual meeting of International Ry. Fuel Assoc.) (13) June 20.
- Location of Feed Water Admission in Locomotives.* D. G. Foley. (Abstract of paper read before the International Master Boilermakers' Assoc.) (47) June 21.
- The Utility of Flue Gas Analyses in Locomotive Testing.* (15) June 21.
- The Erie Track Inspection Car.* E. G. Chenoweth. (15) June 21.
- A Gravity Yard for a Ballast-Crushing Plant.* (14) June 22.
- Performance of Mikado Type Locomotive, Chesapeake & Ohio Ry.* (18) June 22.
- The Double Track Havana Terminal Viaduct.* (14) June 22.
- Concrete Fence Posts on the Burlington Lines.* (14) June 22.
- Design, Construction and Inspection of Locomotive Boilers.* (Abstract from a paper read before the Am. Ry. Master Mechanics' Assoc. (18) June 22; (47) July 12.
- Methods of Constructing the Sand Patch Tunnel of the Baltimore and Ohio Railroad, with Records of Progress.* (86) June 26.
- Present Status of Mechanical Stokers for Locomotives. (Portion of report of Committee on Mechanical Stokers to the Am. Ry. Master Mechanics' Assoc.) (13) June 27.
- The Reconnaissance Survey for the Denver & Rio Grande R. R.* Augustine W. Wright. (13) June 27.
- Standard Railway Crossing Signs for New Jersey.* (13) June 27.
- The Electrification of Steam Railway Terminals. W. F. M. Goss. (Abstract of paper read before the City Club of Chicago.) (96) June 27; (15) June 14.
- Canadian Transcontinental Railway.* (13) June 27.
- Electric Furnace Steel for Rails. W. R. Walker. (13) June 27.
- The Maintenance of Superheater Locomotives. (Portion of report of Committee before the Am. Ry. Master Mechanics' Assoc.) (13) June 27; (47) July 19.
- The Impact of Flat Wheels upon Rails.* C. H. Benjamin. (15) June 28.
- Low Water Locomotive Boiler Tests.* (15) June 28; (18) June 29. (25) July.
- Eight-Motor Articulated Electric Locomotive.* (15) June 28.

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Railroads—(Continued).

- The Application of Electricity to Railway Cab Signalling.* William H. Dammond. (26) June 28.
- Electric Locomotive for Fast Freight and Passenger Service, N. Y., N. H. & H. R. R.* (18) Serial beginning June 29. (17) June 22.
- The Permanent Way of the Victorian Government Railways.* (21) July.
- Superheated Steam in Theory and Practice (for Locomotives). (21) Serial beginning July.
- Nice-Monte Carlo Kearney High Speed Railway.* (21) July.
- Notes on Recent French Tank Engines.* (21) July.
- The Lacroix Train Control System.* (21) July.
- Advantages and Disadvantages of the Use of Arches and Arch Pipes in Locomotive Fire-Boxes. (Report of Committee, Master Boiler Makers Assoc.) (94) July.
- The Benguela Railway: A Shortened Route to the Transvaal.* J. Hartley Knight. (9) July.
- Concrete Ties Taking Place of Wood Supports. (67) July.
- The Relation of Central Station Generation to Railway Electrification.* Samuel Insull. (42) July.
- Recent Development of the Locomotive.* George R. Henderson. (3) July.
- Port Reading Creosoting Plant.* (87) July; (15) July 19.
- Champaign Terminal.* (87) July.
- Central of New Jersey Ice Car.* (25) July; (15) June 7.
- Maintaining Mallet Locomotives.* (25) July.
- Simple Mallet for High Speed.* G. I. Evans. (25) July.
- Chickasha Terminal.* (87) July.
- An Ideal Boiler Tube Department (for repairing locomotive boiler tubes).* (25) July.
- Articulated Electric Locomotives with Eight Motors.* (25) July.
- Repairing Driving Boxes.* M. H. Westbrook. (25) July.
- Pacific Type Locomotive with Gaines Firebox.* (25) July.
- Gas-Electric Cars for the Frisco. (25) July.
- Notes on the Cost of Operation of the Washington, Baltimore & Annapolis Electric Railroad. (86) July 3.
- Track Maintenance. Wm. Thom. (Paper read before the Annual Congress of the Tramways and Light Rys. Assoc. at Swansea.) (73) July 5.
- Reconstruction of the Panama Railroad. (15) July 5.
- Locomotive Boiler Flue Gas Analysis. Lawford H. Fry. (15) July 5.
- Two Railway Extensions in Ontario.* (15) July 5.
- Pacific Type Locomotive for the St. Louis & San Francisco R. R.* (18) July 6.
- Track Studies by the Track and Roadway Division of the Board of Supervising Engineers.* (17) July 6.
- Electrification of Butte, Anaconda & Pacific R. R. (16) July 6; (18) July 6.
- Building a Coal Road Extension through the Pennsylvania Mountains.* (14) July 6.
- Broken Rail in a Great Northern Wreck.* James E. Howard. (Report to the Interstate Commerce Comm.) (20) July 11; (18) July 20.
- New Passenger Terminal at Vancouver, B. C., Canadian Pacific R. R.* E. J. Beugler. (13) July 11; (14) July 20; (18) July 6; (96) July 18; (86) July 17.
- Automatic Block Signaling for Single-Track Railways.* James B. Latimer. (13) July 11.
- Rail-Wear and Corrosion in the Simplon Tunnel.* (13) July 11.
- Rail and Water Terminals at Texas City.* Harvey A. Thomas. (15) July 12.
- Simple High Speed Articulated Locomotive.* (15) July 12.
- A Powerful Mallet Compound Locomotive.* (47) July 12; (18) June 22.
- Railroad Building in Alaska.* Day Allen Willey. (19) July 13.
- Heating Trains by Means of Air Pump Exhaust.* (18) July 13.
- The Havana Terminal Train Shed.* (14) July 13.
- A Heavy Concrete Skew Arch.* (14) July 13.
- Northern Pacific Ry. Station, Tacoma.* (13) July 18.
- A High-Power Passenger Locomotive.* (13) July 18.
- Anthraxite Burning Pacific Type Locomotives.* (15) July 19.
- Eight Wheels Coupled Goods Engine, Indian State Railways.* (12) July 19.
- Superheater for 6-Horse-Power Single-Cylinder Traction Engine.* (11) July 19.
- Heavy Work on Spokane-Portland Short Line.* (14) July 20.
- Results of Treated Tie Experiments, Gulf, Colorado & Santa Fe Railway. (18) July 20.
- Building Railroads to Develop Lumber Districts in Arkansas. A. M. Van Auken. (18) July 20.
- Tests of Holding Power of Track Spikes and Indentation by Tie Plates in Various Kinds of Timber.* (Supervising Engrs., City of Chicago.) (86) July 24.
- Methods Used in Four-Tracking on the New York Central & Hudson River R. R.* (86) July 24.
- Selection of Electric Locomotive for Interurban Freight Hauling. (From Bulletin of Westinghouse Electric and Mfg. Co.) (96) July 25.
- Difficulties in Constructing the Little Rock Southern Ry. J. W. Stark. (13) July 25.

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Railroads—(Continued).

- Yard and Shop Improvements at Boone, Iowa. H. Rettinghouse. (15) July 26.
 Report of Annual Inspection of Experimental Tracks on the Gulf, Colorado & Santa Fe. (15) July 26.
 Good Results from New Locomotives. (Pere Marquette.) (15) July 26.
 Pacific Type Locomotives for the Delaware, Lackawanna & Western R. R.* (18) July 27.
 Handling Freight at Local Stations. R. O. Wells. (Paper read before the St. Louis Ry. Club.) (18) July 27.
 Modern Railroad Track Scales.* Eugene Watchman. (62) July 29.
 The Use of Light Weight Locomotives for Conveying Concrete over Portable Tracks.* Henry Robiezek. (86) July 31.
 Note sur l'Entretien des Tiroirs Cylindriques des Locomotives de la Compagnie de l'Est.* E. Bernard. (38) May.
 Le Chemin de Fer Electrique de Villefranche à Bourg-Madame (Pyrénées-Orientales).* (33) Serial beginning May 4.
 Les Chemins de Fer du Brésil.* A. Le Vergnier. (33) May 18.
 La Question des Tarifs de Chemins de Fer en Belgique. Georges De Leener. (30) June.
 Les Ecartements de Chemins de Fer. Lionel Wiener. (30) June.
 Essais des Locomotives Pacific Compound à Surchauffe de la Compagnie d'Orléans. Paul Conte. (38) June.
 Notice sur les Répartiteurs des Charges Statiques, Système *Guillaumin* Disposés pour l'Usage des Locomotives à Voie Etroite et des Tramways.* (92) June.
 Le Projet d'Electrification des Lignes de Ceinture et de Banlieue de Berlin.* (33) June 1.
 Le Chemin de Fer Electrique de la Bernina (Engadine, Suisse).* A. Le Vergnier. (33) June 8.
 La Perception des Signaux en Temps de Brouillard Répétiteurs Lumineux de la Ligne de Bruxelles à Anvers. (33) June 15.
 Le Frein à Vide, Automatique et Modérable; Système Clayton (Breveté).* (34) July.
 Type de Passerelles Suspendues pour Signaux Installées aux Extrémités du Tunnel des Batignolles.* Froebé. (38) July.
 Querbahnsteigballe in Eisenbeton für den Hauptbahnhof in Leipzig.* (51) Serial beginning Sup. No. 7.
 Umgestaltung der Bahnanlagen bei Spandau und Bau eines Verschiebebahnhofes bei Wustermark.* E. Giese. (49) Serial beginning Pt. 4.
 Ueber das Verdampfungsgesetz und das Gesetz der Wärmeübertragung des Lokomotivkessels. O. Köchy. (48) Mar. 30.
 1 C 1-Schnellzuglokomotive.* Michin. (48) Mar. 30.
 Umbau der Bahnhöfe Leipzig: Sächsischer Teil-Hauptbahnhof Leipzig.* Toller. (102) Apr. 1.
 Die Abhängigkeit des Kohlenverbrauches der Lokomotiven von der Zylinderleistung. J. Jahn. (102) Serial beginning Apr. 1.
 Zugbeleuchtung bei elektrischen Bahnen mit hochgespanntem Gleichstrom.* P. Amsler. (41) Apr. 4.
 Ueber die Abrostungserscheinungen am eisernen Oberbau im Simplontunnel.* Alb. Dänzer-Ischer. (107) Serial beginning Apr. 13.
 Selbsttätiger Druckausgleich bei Lokomotiv-Zylindern.* E. Krauss. (102) Apr. 15.
 Die neuen Linien der Rhätischen Bahn Islanz-Disentis und Bevers-Schuls.* P. Saluz. (107) Serial beginning Apr. 20.
 Benzolelektrische Eisenbahn-Motorwagen.* A. Heller. (48) Apr. 27.
 Die Grösse der Stufe am unbelasteten Schienenstosse.* H. Raschka. (102) May 1.
 Welchen 1:15 der Gesellschaft für den Betrieb von Niederländischen Staatsbahnen. (102) May 1.
 Tunnelbauten in Beton und Eisenbeton.* H. W. K. Ziesemer. (80) May 4.
 Das neue Empfangsgebäude auf dem Hauptbahnhof in Leipzig.* Otto Sarrazin und Friedrich Schultze. (40) May 4.
 Der Oberbau auf den Hauptbahnen der badischen Staatseisenbahnen.* E. Lang. (102) June 1.
 Wirtschaftlichkeit von Bahnkraftwerken mit Nebenbetrieben. Rich. Schröder. (39) June 5.
 Schwebebahnen oder feste Seilbahnen? R. Zehnder-Spörry. (53) June 7.
 Verbrauchsmengen und Buchungsverfahren für Heiz- und Schmier-Stoffe bei amerikanischen Bahnen.* B. Schwarze. (102) June 15.
 Lokomotivbekohlung.* F. Zimmermann. (102) June 15.
 Das Eisenbahnverkehrswesen auf der Weltausstellung Turin, 1911.* C. Guillery. (102) Serial beginning July 1.
 Feuerung mit Oebrickständen bei den rumänischen Staatsbahnen.* F. W. Kraft. (102) July 1.
 Ueber die gleichmässigste Verteilung der Achsbelastungen bei Lokomotiven.* A. Langrod. (102) July 1.

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Railroads, Street.

- 1 200-Volt Traction in the United States of America.* T. Stevens. (77) May.
 The Recent Flood in the New Subway at Berlin.* (19) May 4.
 Constructing the Lexington Avenue Subway; Methods of Excavating, Timbering and Underpinning Lexington Avenue, New York, from 106th to 118th Streets.* (14) May 4.
 New Terminals for Brooklyn Bridge.* (13) May 9.
 Resistance Standards.* C. W. Squier. (17) May 11.
 Coney Island Terminal of the Coney Island & Brooklyn Railroad.* (17) May 11.
 Two Reports Submitted to Council Committee on Values of Chicago Elevated Railways. (17) Serial beginning May 11; (86) May 15.
 Ventilation of the Central London Railway.* (12) May 17.
 The Valuation of the Elevated Railroads of Chicago. (14) May 18.
 Methods of Constructing the Beacon Hill Rapid Transit Tunnel, Boston, Mass.* (From Report of the Boston Transit Comm., 1911.) (86) May 22.
 Foreign Street Railway Construction.* (14) May 23.
 The Peoria Electrolysis Decree issued May 13 by Judge A. L. Sanborn. (14) May 25.
 New Dayton Cars with Non-Parallel Axle Trucks.* (17) May 25.
 New York City Subway Planning.* (13) May 30.
 Intermittency: Its Effect in Limiting Electric Traction for City and Suburban Passenger Transport.* W. Y. Lewis. (Paper read before the Soc. of Engrs.) (73) May 31.
 The Trolley Vehicle System of Railless Traction.* Henry C. Adams, A. M. Inst. C. E. (Abstract of paper read before the Soc. of Engrs.) (47) Serial beginning June 7.
 A Large Two-Story Car Barn.* (14) June 8.
 The Brooklyn Center-Entrance Car.* (17) June 22.
 Electrical Transmission and Distribution, Chicago Traction Lines.* (17) June 22.
 Chicago City Railway Company's Sand Car with Pneumatic Unload.* (17) June 29.
 The New Nicollet Avenue Carhouse of the Twin City Rapid Transit Company.* (17) June 29.
 The Respective Values of Tramways, Motor Busses and Rail-less Traction as Means of Transport. A. H. Pott. (Abstract of paper read before the Swansea Congress of the Tramways and Light Rys. Assoc.) (73) July 5.
 Tests of Car Heaters. (96) July 4; (17) June 3.
 Trial Double-Deck Prepayment Cars for Liverpool Tramways.* (17) July 6.
 Non-Parallel Axles for Double-Truck Cars.* (17) July 6.
 The Relation of Increase of Street Railway Traffic to Increase of Population.* (86) July 10.
 New Haven Carhouse of the Connecticut Company.* (17) July 13.
 Niles Sub-Station of the Mahoning & Shenango Railway & Light Company.* (17) July 13.
 Beacon Hill Subway Tunnel in Boston.* Wilbur W. Davis. (14) July 13.
 A Heavily Reinforced Concrete Foundation for a Power Station.* (14) July 13.
 Results of Experience with the Chicago and the Cleveland Street Railway Franchise Settlements.* Delos F. Wilcox. (Paper read before the National Municipal League.) (86) July 24.
 Wheel and Journal Maintenance on New York Subway.* (17) July 27.
 A Novel Overhead Construction under a Viaduct.* George H. Lyne. (17) July 27.
 Automotrices Benzo-Electriques des Chemins de Fer Prussiens.* (33) July 6.
 Die Einrichtung elektrischer Zugförderung auf den Berliner Stadt-, Ring- und Vorortbahnen. (41) Apr. 18.
 Lüftung von Strassenbahnwagen. W. Thom. (7) Apr. 27.
 Deutschlands Hoch- und Untergrundbahnen.* Fritz Steiner. (53) Serial beginning May 3.
 Schnellverkehrsfragen in Pittsburg, Pa.* G. Schimpff. (41) May 30.
 Bau- und Betriebsanlagen der Hamburger Hochbahn.* W. Mattersdorf. (41) Serial beginning June 6.
 Die Hamburger Hochbahn.* W. Stein. (53) June 14.
 Neuere Bauausführungen in Eisenbeton bei der württembergischen Staatseisenbahnverwaltung: Eisenbetonrahmenkonstruktionen; Theorie; Berechnung; Beispiele.* K. W. Schaechterle. (78) Serial beginning July 20.

Sanitation.

- Run Off from Sewered Areas.* L. K. Sherman. (4) Apr.
 The Southern Outfall of the Louisville, Ky., Sewerage System. J. B. F. Breed and Harrison P. Eddy. (Abstract of report.) (60) May.
 Heating and Ventilating the Abraham Lincoln School, Boston.* (70) May.
 Dust in Relation to Heating. Conrad Meler. (70) Serial beginning May.
 Progress in Canada in Biological Methods of Sewage Disposal During the Last Twenty Years. Willis Chipman. (Paper read before the Canadian Public Health Assoc.) (96) May 2.
 The Sewage Disposal Works at Lebanon, a Plant Installed to Prevent Pollution of a Stream Used for Water Supply.* (14) May 4.

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Sanitation—(Continued).

- The Design of Institutional Sewage Disposal Plants, with Special Reference to Plants at the Infirmary and the Children's Home of Greene County, Ohio.* A. Elliott Kimberly. (86) May 8.
- The Little River Drainage: A Project for Reclaiming 500 000 Acres of Swamp Land in Missouri.* (86) May 8.
- Heating City Hall at Aberdeen, Miss.* (101) May 10.
- Sewage Treatment at Worcester. (14) Serial beginning May 11.
- Utilizing Gas from Septic Tank for Production of Power. (14) May 11.
- Hot Water Heating for Institutions.* Ira N. Evans. (64) May 14.
- Plans and Specifications for Concrete Sewer Manholes and Forms for Same, at Hamilton, Ill.* L. P. Wolff. (86) May 15.
- Plans for and Estimates of Costs of Draining 33 000 Acres of Swamp Land in North Carolina.* (86) May 15.
- Methods of Handling House Refuse Before Collected by the City.* Samuel A. Greely. (Abstract of paper read before the New Jersey Sanitary Assoc.) (86) May 15.
- Cement Sewer Pipe. Gustave Kaufman. (Paper read before the National Assoc. of Cement Users.) (96) May 16.
- Effects of Headers in Hot-Water Heating.* (101) May 17.
- Notes on the Digestion of Sewage Sludge. Charles Saville. (14) May 23; (96) June 13.
- Furnace Heating in Old Remodeled House.* (101) May 24.
- Time Element in Heating Apparatus.* James A. Donnelly. (Paper read before New York Chapter, Am. Soc. of Heating and Ventilating Engrs.) (101) May 24.
- The Ozonair Ventilating System Installation on the Tube (Central London Railway). (57) May 24; (26) May 17; (73) May 17.
- The Joint Scheme of Sewerage of Thornton-le-Fylde, Blispham, with Norbreck and Carleton. Arthur Hindle. (From paper read before Royal San. Inst.) (104) May 31.
- Ventilation of Pennsylvania Tunnels.* B. W. Bennett. (101) May 31; (70) June.
- Modulation Heating in Residences.* (101) May 31.
- The Relation Between Vents and Pipe Coil Heaters as Affected by the Frictional Resistance to the Passage of Air. Frank L. Busey. (70) June.
- The Heating, Ventilating and Air Washer System in the Engineering Building, University of Cincinnati.* (70) June.
- Increasing Human Efficiency by Ozone.* W. H. Radcliffe. (10) June.
- Reduction in Putrescibility of Sewage by Settling and by Filtration. Arthur Lederer. (Paper read before the Am. Public Health Assoc.) (60) June.
- Methods and Results of Sewer Flushing.* (60) June.
- Gigantic Drainage Project. Two Hundred and Fifty Car Loads of Tile and Two Years' Time Consumed in Draining Tract of Land near Chicago.* (76) June 1.
- The Influence of Ozone in Ventilation. Leonard Hill and Martin Flack. (19) June 1.
- The Struggle with Sewage Sludge. Wm. Naylor. (104) June 7.
- Warm-Air and Steam Heating in Church.* (101) June 7.
- Air Washers and Humidifiers for Public Buildings, Factories and Mines.* (19) June 8.
- The Refuse Destructor at Havana.* (14) June 8.
- Heating and Ventilating Large Laboratory.* (101) June 14.
- Sewage Disposal by Septic Tank.* Archineer. (101) June 14.
- Refuse Disposal at Fürth, Germany.* Alfred Gradenwitz. (19) June 15.
- A 60-Ton Refuse Destructor at Montgomery, Ala.* John Primrose. (13) June 20.
- Water Heating by Garbage Burning.* (101) June 21.
- The Sewage Disposal Works at Pelham.* (14) June 22.
- Combined Flood-Wall and Intercepting Sewer.* (14) June 22.
- Steam Heating Large Department Store.* Davis S. Boyden. (101) June 28.
- Screening as an Anti-Malaria Measure.* A. J. Orenstein. (14) June 29.
- Government Specifications for Hot Water Heating System at United States Reservation, Arlington, Va.* (70) July.
- The Sewerage System of Baltimore.* Stuart Stevens Scott. (60) July.
- Vitrified Sewer Block.* (76) July 1.
- City Refuse Disposal at Seattle.* Geo. Holmes Moore. (13) July 4.
- Bridlington and Some of Its Municipal Works and Undertakings.* Ernest R. Matthews. (Paper read before the Inst. of Mun. and County Engrs.) (104) July 5.
- Industrial Lead Poisoning. James O. Clifford. (103) July 6.
- Prevention of Aerial Nuisance from Sewage Containing Brewery Waste, Deodorisation Methods in Use at Stratford-Upon-Avon. Herbert D. Bell. (Paper read before the Assoc. of Managers of Sewage Disposal Works.) (104) July 12.
- The Disposal of a City's Waste.* Franz Schneider, Jr. (46) July 13.
- The Bacterial Purification of Water and Sewage.* Earle B. Phelps. (46) July 13.
- Fixed and Traveling Sewage Distributors. Reginald Brown. (Paper read before the Assoc. of Managers of Sewage Disposal Works.) (14) July 13.

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Sanitation—(Continued).

- Sewage Disposal at East Ham. J. E. W. Birch. (Paper read before the Inst. of Mun. and County Engrs.) (14) July 13.
- The Plans and Specifications for the Construction of Sewer Catch Basins in Pittsburgh, Pa. Specifications for Concrete and Brick Masonry in Sewers and Appurtenances.* (86) July 17.
- An Electrical Sewage Disposal Plant.* C. L. Edholm. (96) July 18.
- Removal of Refuse by Fans. F. R. Still. (Paper read before the Am. Soc. of Heating and Ventilating Engrs.) (20) July 18.
- Methods for Differentiating Soils for Sewage Purification.* Gilbert J. Fowler and William Clifford. (Paper read before the Assoc. of Mgrs. of Sewage Disposal Works.) (104) July 19.
- Office Practice in Estimating Heating and Ventilation.* John D. Small. (Paper read before the Am. Soc. of Heating and Ventilating Engrs.) (14) July 20.
- Sewage Disposal Works at a Pennsylvania Hospital. (14) July 20.
- Chattanooga's Sewage Pumping Station.* (14) July 20.
- Plumbing a Modern Apartment House.* (101) July 26.
- Heating and Ventilation of a Mitten Factory.* Samuel R. Lewis. (Paper read before the Am. Soc. of Heating and Ventilating Engrs.) (101) July 26.
- Sewage Disposal Works at Bellefontaine.* (14) July 27.
- Sewage Disposal Plans for Jamaica Bay, New York. (14) July 27.
- The Submerged Outfall Extension of the Bronx Valley Sewer.* (14) July 27.
- Methods Used in Effecting the Preliminary Organization of a 450,000 Acre Drainage and Levee Project in Southeastern Missouri.* L. T. Berthe. (86) July 31.
- L'Abattoir Industriel. G. de Goër de Herve. (32) Mar.
- Entwurf, Bau und Betrieb der Kanalisation in Luckenwalde. Otto Geissler. (39) Mar. 20.
- Ueber Dimensionierung städtischer Kanalnetze. R. Weyrauch. (7) Mar. 30.
- Kanalisation und Abwasserreinigungsanlagen des Entwässerungsverbandes der Landgemeinden Stellingen-Langenfelde, Lokstedt, Eidelstedt und Niendorf.* F. Guth. (7) Mar. 30.
- Einige praktische Erfahrungen beim Betriebe von biologischen Kläranlagen. Dr. Paetsch. (7) Apr. 6.
- Moderne amerikanische Installation.* Joseph Wm. Peter. (7) Apr. 6.
- Die Beheizung der Wohn- und Geschäftsräume mittels Leuchtgas elektrischer Energie.* Rich. Schröder. (51) Serial beginning Apr. 20.
- Ein Betrag zur Frage der Abwasserreinigung durch Salpeterzusatz. Bach. (7) Apr. 27.
- Eine neue Art von Pumpenheizungen.* Werner Berli. (7) May 4.
- "Frisches" und "fäuliges" Abwasser. Bach. (39) May 5.
- Das Städt. Hallenschwimmbad in Spandau mit Fernwarmwasserversorgung durch Abdampfverwertung.* Ludwig Volk. (7) May 11.
- Hygiene und Volkswirtschaft in den Bauordnungen.* Küster. (From a paper read before the Vereinigung der höheren technischen Baupolizeibeamten Deutschlands.) (39) May 20.
- Beseitigung der Abwässer. Millitzer. (39) May 20.
- Forschungsarbeiten der Prüfungsanstalt für Heizungs- u. Lüftungseinrichtungen der Kgl. Technischen Hochschule, Berlin, nebst einem Anhang über "Abwärmeverwertung."* K. Brabbée. (From a paper read before the Berliner Bezirksverein Deutscher Ingenieure.) (7) Serial beginning May 25.
- Ueber die Wahl der Vorlauftemperatur einer Schwerkraft-Warmwasserheizungsanlage, mit Rücksicht auf die jeweilige Aufsentemperatur.* O. Liersch. (7) June 29.
- Ueber die Beeinflussung des biologischen Verfahrens durch industrielle Abwässer. K. Thimme. (7) June 29.
- Ueber Kleiderdesinfektion in einem zerlegbaren Formaldehydschrank. Sobernheim und F. Dithorn. (7) July 6.

Structural.

- The Endurance of Metals.* E. M. Eden, W. N. Rose and F. L. Cunningham. (75) Oct.
- Wind Pressure Against Inclined Roofs.* H. P. Boardman. (4) Apr.
- Holder Construction.* A. F. Young. (Paper read before the Eastern Counties Gas Mgrs.) (66) Apr. 30.
- Assembling and Reaming. (4) May.
- Effect of Wood Structure on Preservative Treatment.* Howard F. Weiss. (Abstract of paper read before the Wood Preservers' Assoc.) (87), May.
- Constructing a Concrete Pile Foundation.* (13) May 2.
- Government Tests on Waterproofing and Damp-Proofing of Concrete and on Waterproofing Compounds. (Abstract from *Technologic Papers*, Bureau of Standards.) (13) May 2; (67) July.
- Bending Moments of Reinforced Concrete Beams. Maurice Behar. (Abstract of paper read before the Concrete Inst.) (14) May 4.
- Concrete Fence Posts.* L. J. Hotchkiss. (Paper read before the National Assoc. of Cement Users.) (96) May 2; (86) June 12.

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Structural—(Continued).

- Timber-Treating Plant of the B. & O. Railroad. (62) May 6.
 Steel or Concrete for Gasholder Tanks.* Herbert W. Alrich. (Paper read before the National Assoc. of Cement Users.) (66) May 7.
 A Series of Tests to Determine Stresses in Reinforced Concrete Floors in Completed Buildings.* (Abstract of Report of Comm. of National Assoc. of Cement Users.) (86) Serial beginning May 8.
 The Strength of Rolled Zinc.* Herbert F. Moore. (Abstract of *Bul. Univ. of Ill.*) (13) May 9.
 United States Government Tests on Reinforced Concrete Beams. (13) May 9; (96) June 13.
 The Design of a Brick Chimney.* J. Norman Jensen. (13) May 9.
 Structural Details of Copper Cupola: Method of Obtaining Working Measurements from Rough Framing in the Construction of Architectural Sheet Metal Work.* William Neubecker. (101) Serial beginning May 10.
 Underpinning Heavy Walls with Footings on Sand. (14) May 11.
 Arch Floor Construction.* (14) May 11.
 Field Testing and Inspection on Reinforced Concrete Building Contracts; the Methods Followed on the Construction of Several Warehouses in Brooklyn. (14) May 11.
 Underpinning Buildings Adjacent to the Lexington Avenue Subway in New York.* (14) May 11.
 The Steel Substructure of the Merchants' and Manufacturers' Exchange Building.* (14) Serial beginning May 11.
 Cost of Brick Construction. George Hunt Ingraham. (From *Brickbuilder.*) (76) May 15.
 Penalizing Fireproof Construction in New York City.* Allen E. Beals. (76) May 15.
 A Novel Factory Building.* (13) May 16; (20) May 23.
 A Reinforced Concrete Factory with Tile and Concrete Floors.* (14) May 18.
 U. S. Government Specification for Portland Cement.* (18) May 18.
 Some Facts About the New Gasholder Being Erected for the Consolidated Gas, Electric Light and Power Company, Baltimore, Md.* (24) May 20.
 Spiral-Guided Gasholders at Oldham. T. Duxbury. (Paper read before the Manchester District Institution of Gas Engrs.) (66) May 21.
 Effects of Age upon the Ultimate Strength, Modulus of Elasticity and Yield Point of Concrete in Compression. (Abstract of Report by U. S. Bureau of Standards.) (86) May 22.
 Corrosion of Steel and Its Prevention.* Allerton S. Cushman. (Paper read before the Am. Iron and Steel Inst.) (20) May 23.
 The Boiling and Steam Tests of Cement.* William P. Gano. (13) May 23.
 Peculiar Cracking of a Brick Chimney and Its Repair.* J. Walter Ackerman. (13) May 23.
 I-Beam Grillage in Place of Cast-Iron or Cast-Steel for Column Bases.* (13) May 23.
 Rapid Winter Construction of a Reinforced-Concrete Building.* F. E. Schilling. (13) May 23.
 Wall Flashing for a Slate Roof.* J. Henry Teschmacher, Jr. (101) May 24.
 Proposed British Standard Tests for Concrete and Reinforced Concrete. (Report of Comm. of Concrete Inst. of Great Britain.) (14) May 25.
 Method of Field Inspection of Concrete in Building Work. G. H. Bayles. (Paper read before the National Assoc. of Cement Users.) (86) May 29.
 Further Thoughts on the Physical Chemistry of the Defective Sands. Richard H. Gaines. (13) May 30.
 Defective Concrete Sands. John R. Freeman. (13) May 30.
 Possible Explanation of the Defective Sands. E. E. Free. (13) May 30.
 New Building By-Law for Toronto. (96) Serial beginning May 30.
 Waterproofing of Engineering Structures.* W. H. Finley. (4) June.
 Failures of Reinforced-Concrete Structures.* Edward Godfrey. (58) June.
 Methods of Testing Coatings for Cement Surfaces. Cloyd M. Chapman. (14) June 1.
 The Large Pneumatic Foundations of the New York Telephone Building.* (14) June 1.
 Cheaper Paint for the Navy. Henry Williams. (Extracts from paper in U. S. Naval Inst. Proc.) (13) June 6.
 Concrete Column Economics.* J. Norman Jensen. (13) June 6.
 Hollow-Cone Foundations in Reinforced Concrete.* (96) June 6.
 Recent Developments in Paint Technology.* Henry A. Gardner. (Paper delivered before Am. Inst. of Archts.) (96) June 6.
 The Corrosion of Iron and the Protection of Structural Ironwork. L. Archbutt. (Paper read to the Derby Soc. of Engrs.) (11) Serial beginning June 7; (47) July 5.
 Roof Construction a Factor in Fires.* H. N. Taylor. (101) June 7.
 Demolition by Explosives at Port Talbot.* (12) June 7.
 Autoclave Boiling Test for Cement.* H. J. Force. (13) June 13.

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Structural—(Continued).

- Iron Corrosion Investigations. Oliver P. Watts. (Abstract of paper read before the Am. Electro-Chemical Soc.) (47) June 14.
- Reinforced Concrete as Applied to Mine Shafts. E. R. Jones. (Abstract of paper read before the Assoc. of Min. Engrs. of the Copper Country, the Michigan College of Mines Club.) (62) June 17.
- Standard Specification for Refractory Materials. Refractory Materials Committee. (Paper read before the Inst. of Gas Engrs.) (66) June 18.
- Standard Concrete Forms Used in the Philippines.* R. McC. Beanfield. (13) June 20.
- Proposed Improvements in the Building Department at Chicago.* (13) June 20.
- Spread Footings for a Large Concrete Factory.* (14) June 22.
- The Economical Design of Reinforced-Concrete Beams.* R. B. Ketchum. (Abstract of *Bulletin*, Univ. of Utah.) (86) June 26.
- Unit Wall Concrete Building Construction, Fort Crockett, Texas.* R. C. Hardman. (13) June 27.
- An Armory Roof with a Truss of 126-Foot Span.* (14) June 29.
- The Use and Stability of Reinforced Concrete in Sea Water.* Raymond Baffery. (Paper read before the National Assoc. of Cement Users.) (67) July.
- Port Reading Creosoting Plant.* (87) July.
- Magnetism of Iron-Nickel, Iron-Cobalt and Nickel-Cobalt Alloys. Pierre Weiss. (Paper read before the Faraday Soc.) (105) July.
- Waterproofing Against Pressure.* (67) July.
- Fire-Resisting Construction for Industrial Plants.* F. P. Walther. (9) July.
- Floors and Floor Construction for Manufacturing Plants.* Henry Grattan Tyrrell. (9) Serial beginning July.
- Caisson Foundations for the Seamen's Church Institute Building. Maurice Deutsch. (6) July.
- A General Formula for the Torsional Deflection of Shafts.* S. E. Slocum. (3) July.
- Molded Brick for Ornamental Work.* (76) July 1.
- A Reinforced Concrete Baseball Grandstand.* (14) July 6.
- Concrete Foundations on Rock in Deep Open Pits. (14) July 6.
- A New 35-Story Office Building in Seattle.* (14) July 6.
- The New Cellular Concrete Wall Along the Speedway, New York.* (14) July 6.
- Constructing the Foundations of Tall Warehouse Buildings.* (14) July 6.
- The Need of a More Severe Soundness Test for Cement. Henry S. Spackman. (13) July 11.
- Fire in a Reinforced-Concrete Pulp Mill.* Morton C. Tuttle. (13) July 11.
- Concrete Piles.* Maxwell M. Upson. (Abstract of paper read before the Am. Soc. of Eng. Contractors.) (15) July 12.
- A New Process of Making Concrete Poles.* (14) July 13.
- A Heavily Reinforced Concrete Foundation for a Power Station.* (14) July 13.
- Standardizing Carbon Tool Steel. Henry Otto. (Paper read before the Ry. Tool Foremen.) (20) July 18.
- Service Equipment of a Combined Theater and Office Building.* W. A. Ehlers. (13) July 18.
- Reinforced Concrete.* T. E. Thain. (Paper read before the South Wales Inst. of Engrs.) (22) July 19.
- Electrolysis of Reinforced Concrete.* Harold P. Brown. (13) July 25.
- Construction of the Woolworth Building.* (14) July 27.
- The Preservation of Reinforced Concrete in Sea Water. Edward Burr. (Paper read before the International Cong. of Navigation.) (86) July 31.
- Altérations Chimiques dans l'Eau de Mer des Mortiers de Ciment Additionnés de Pouzzolane. (84) Mar.
- Influence de la Vapeur à Haute Pression sur la Résistance à l'Ecrasement des Mortiers et Betons de Ciment. (84) Mar.
- Effets des Hautes Températures sur le Béton de Ciment Portland. Charles L. Norton. (84) Mar.
- Etude sur les Nouvelles Méthodes d'Essais Mécaniques des Métaux.* R. Guillery. (32) Mar.
- Sur le Renforcement d'Ouvrages ou de Pièces en Fonte au Moyen du Ciment Armé. Goupil. (43) Mar.
- Note sur la Propagation de la Chaleur dans les Murs. F. P. Thonet. (30) Apr.
- Des Effets Thermiques dans les Ouvrages en Maçonnerie.* G. Denil. (30) Apr.
- Le Clou.* Ch. Fremont. (92) Serial beginning Apr.
- L'Hydraulite: Élément Essentiel des Ciments Calcaires. F. Ferrari. (Abstract of article in *Il Cemento*.) (84) May.
- La Fonte Frettée. F. von Emperger. (84) May.
- Examen des Supports de Bâtimens au Point de Vue des Flexions Secondaires.* Léon Cosyn. (35) June.
- La Fonte Frettée. Considère. (84) June.
- Etude sur les Nouvelles Méthodes d'Essais Mécaniques des Métaux.* R. Guillery. (93) June.
- Le Calcul des Poutres Tubulaires en Ciment Armé.* P. Caufourier. (33) June 15.

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Structural—(Continued).

- Observations sur la Structure de Quelques Pièces Brutes de Forge; Relation entre les Propriétés Mécaniques et la Structure de "Widmanstätten."* A. Portevin et V. Bernard. (93) July.
- Les Effets Thermiques dans les Ouvrages en Maçonnerie.* (33) July 6.
- Die Berechnung und Dimensionierung von einfach und doppelt armierten auf Druck und Biegung beanspruchten Querschnitten. Johs. Thiemé. (51) Sup. No. 12.
- Versuche mit Säulen und deren Berechnung. E. Mörsch. (51) Serial beginning Sup. No. 13.
- Beitrag zur Theorie der Rippenkuppel.* H. Marcus. (49) Pt. 4.
- Versuche mit Stampfbeton verschiedener Zusammensetzung. M. Gary. (Paper read before the Deutsche Beton Verein.) (78) Sup. No. 1.
- Prüfmaschine von 3 000 t Druckkraft für Eisenkonstruktionsteile.* Seydel. (48) Mar. 23; (69) Apr.
- Einheitliche Technische Baupollzeivorschriften. Fischmann. (From a paper read before the höheren technischen Baupollzeibeamten in Berlin.) (69) Apr.
- Bau des Warenhauses "Mariahilfer Zentralpalast."* Hans Mikula. (78) Serial beginning Apr. 1.
- Die Ausbeute des Betons. M. Marcichowski. (78) Apr. 1.
- Die Einwirkung von Säuren auf Beton. Erwin Neumann. (80) Apr. 6.
- Technische Erfahrungen bei Bavunfällen.* Petry. (Extract from paper read before the Deutsche Beton Verein.) (51) Apr. 13.
- Neuere Hallen- und Rahmenkonstruktionen in Eisenbeton.* Em. Haimovici. (78) Serial beginning Apr. 20.
- Die Kalziumsilikate der Kalksandsteine. Bernh. Kosmann. (Abstract of paper read before the Verein der Kalksandsteinfabriken zu Berlin.) (80) Apr. 25.
- Schachtausbau und Versteinerungsverfahren.* (80) Apr. 27.
- Versuche Bachs mit Eisenbetonbalken. Max Ritter von Thullie. (80) Apr. 27.
- Die Einwirkung von Säuren auf Beton. A. Moye. (80) Apr. 27.
- Gründung einer Kirche auf Betonpfähle System "Mast."* W. Colberg. (51) Apr. 27.
- Versuche mit Stampfbeton. M. Gary. (Extract from paper read before the Deutsche Beton Verein.) (51) Serial beginning Apr. 27.
- Die Tetmajer-Krohnschen Knickformeln und Knickformeln für Nickelstahl-stäbe.* L. Schaller. (69) May.
- Ueber die Rostschutzmittel des Eisens. Rohland. (39) May 5.
- Der an beiden Enden eingespannte Balken.* W. Wieser. (78) May 8.
- Hydraulischer Kalk für Kalksandsteine. B. Krieger. (80) May 9.
- Die Knutsen-Bleche, ihre statischen Verhältnisse und ihre Anwendbarkeit im Bauwesen.* H. Nitzsche. (51) May 15.
- Technische Bedingungen für die Abnahme von Portland-zementen in Russland. (52) Serial beginning May 15.
- Das Umschlagen von Portlandzement. (80) May 18.
- Neuzeitliche Mörtel. M. Gary. (51) May 25.
- Die Friedenskirche in Offenbach a. M. und ihre Konstruktion.* Steinberger. (78) May 28.
- Einflusslinien der Spannungen in Fachwerken mit Starren Knotenpunktverbindungen. Pirlet. (69) Serial beginning June.
- Beiträge zur Frage des Schlackenbetons. A. Knaff. (Report of the Hochofenkommission des Vereins Deutscher Eisenhüttenleute.) (50) Serial beginning June 6.
- Die Eisenbetonkonstruktionen am Neubau der Technischen Lehranstalten Offenbach a. Main.* Jean Wörreln. (78) June 12.
- Beton von Kalksteinschotter. H. Nitzsche. (78) June 12.
- Die Eisenkonstruktionen im Städtischen Gaswerk Wienleopoldsdau.* Friedrich Bleich und Rudolph Schuhmann. (69) Serial beginning July.
- Fabrikneubau der Kattundruckerei von Gebrüder Jentzsch in Naundorf i. Sachsen.* C. A. Einbeck. (78) July 1.
- Der Um- und Aufbau der Uto-Garage in Zürich (am. See).* S. Zipkes. (78) July 1.
- Beitrag zur Frage der Biegebalkenprobe für Beton: Versuche mit dem "Reformprüfer" der Firma Buchheim u. Helster, Frankfurt a. M.* H. Nitzsche. (78) Serial beginning July 1.
- Die Dimensionierung von Eisenbetonquerschnitten mit kreisförmigen Begrenzungslinien.* J. Kreblitz. (78) Serial beginning July 20.
- Zur Verbundfrage.* Fritz von Emperger. (70) Serial beginning July 20.
- Neuere Versuche mit Kontrollbalken.* (78) Serial beginning July 20.

Topographical.

- A Drafting Table for Tracing Through Opaque Paper.* A. T. Schwennesen. (56) Vol. 42.
- A Proposed Method of Interpreting the Elevation of All Portions of Street Surface from the Established Grades.* Vernon S. Moon. (Abstract of paper read before the Soc. of Mun. Engrs. of New York.) (86) May 8.

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Topographical—(Continued).

- Adjustable Wires for Stadia Surveying. Ernest McCullough, M. Am. Soc. C. E. (14) May 11.
 Cost of Taking Topography by Transit and Stadia. A. W. Robinson. (86) May 15.
 Cost of Surveys. (96) May 23.
 Methods and Cost of Making Subdivision on Topographical Survey for Sunnyside Unit, Yakima Project; U. S. Reclamation Service.* W. E. Whittier. (86) June 12.
 The Three Point Problem and Hydrographic Surveys.* James P. Allen. (100) July.
 Precise Levelling in Canada. F. R. Reid. (Paper read before the Ottawa Branch, Royal Astronomical Soc.) (96) Serial beginning July 11.
 Short Base Triangulation Methods on Reconnaissance and Exploratory Surveys. D. L. Reaburn. (13) July 25.
 Method and Cost of a Topographical Survey of the Preston Beck, Jr., Grant in New Mexico.* Vincent K. Jones. (86) July 31.

Water Supply.

- Fire Line Meters: A Comparison of Efficiency. George Houston. (59) 1911.
 Pumping Station Management in Milwaukee.* Thomas McMillan. (59) 1911.
 The Restoration of Old Distributing Systems.* Burt B. Hodgman. (59) 1911.
 Some Fundamental Considerations in the Determination of a Reasonable Return for Public Fire Hydrant Service.* Leonard Metcalf, Emil Kuichling, William C. Hawley. (59) 1911.
 Emergency Intakes. William P. Mason. (59) 1911.
 A Stand Pipe Accident.* H. C. Hodgkins. (59) 1911.
 Wood Stave Pipe. T. Chalkley Hatton. (59) 1911.
 Water Rates. Geo. G. Earl. (59) 1911.
 Steel vs. Cast Iron Pipe. Allen Hazen. (59) 1911.
 Hot Water Troubles. George C. Whipple. (59) 1911.
 The Interpretation of Water Analyses. Daniel D. Jackson. (59) 1911.
 Purification of Drinking Water.* John L. Leal. (59) 1911.
 Compressed Air in Water Works Construction. Alexander Milne. (59) 1911.
 Sterilization of Water by Ultra Violet Rays. A. E. Walden and S. T. Powell. (59) 1911.
 Water Softening by Means of Zeolith.* Boris N. Simin. (59) 1911.
 Some Water Works Experiences in India.* R. W. Lawton. (59) 1911.
 The Investigation of Underground Water Waste in Washington. D. C. W. A. McFarland. (59) 1911.
 High Pressure Fire Service Compared with Portable Fire Engines. Charles A. Hague. (59) 1911.
 Sydney Water Supply, its History and Management.* Charles W. Smith (M. Inst. C. E.). (59) 1911.
 Methods of Keeping Records of Improvement to Establish Water Works Plants.* Charles Carroll Brown. (59) 1911.
 Stripping Reservoir Sites at Newcastle, England. H. S. Coventry. (59) 1911.
 Derwent Valley Water Scheme.* (66) Apr. 9.
 An Electrolytic Sterilising Plant.* (26) Apr. 26.
 The Value of Pure Water. Chas. B. Burdick. (Paper read before the Indiana San. and Water Supply Assoc.) (60) May.
 Centrifugal Pumping Plants for Irrigation and Drainage.* H. L. Hutson. (Paper read before the Louisiana Eng. Soc.) (1) May.
 Water Resources of Minnesota. Geo. A. Ralph. (Paper read before the Civil Engrs. Soc. of St. Paul.) (1) May.
 Rock Crushing Plant, Kensico Dam.* Samuel W. Traylor. (67) May.
 The Hebgen Dam.* Henry H. Cochrane. (Paper read before the Montana Soc. of Engrs.) (1) May.
 Report on the Water Purification Plant of Quincy, Ill. (13) May 2.
 Tunnel Lining, Catskill Aqueduct.* M. E. Zipser. (13) May 2.
 Waterworks Extension at Singapore.* (12) May 3; (104) Apr. 26.
 The Swedish State Power Stations.* (11) May 3.
 Water Rights in Connection with Water Power. Richard A. Hale. (Abstract of paper read before the National Assoc. of Cotton Mfrs.) (14) May 4.
 Utilizing Water Power at the Cincinnati Filtration Plant.* J. S. Gettrust. (14) May 4.
 New Water Purification Works at Ottumwa.* (14) May 4.
 Investigation of the Filter Plant at Sandusky, Ohio. (14) May 4.
 A Water-Power Ice Plant near Joplin, Mo.* (27) May 4.
 "Excess Lime" Method of Treating Water. (66) May 7.
 Some Economic Considerations Affecting the Design of the Power Plant for Water-Works Pumping Stations. Nicholas S. Hill. (Abstract of paper read before the Soc. of Mun. Engrs. of New York.) (86) May 8.
 Methods of Shaft Excavation in Earth at the Rondout Pressure Tunnel of the Catskill Aqueduct.* Lazarus White. (Abstract of paper read before the Soc. of Mun. Engrs. of New York.) (86) Serial beginning May 8.

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Water Supply—(Continued).

- Methods and Cost of Solidifying Fissured Rock by Grouting: Estacada Dam, Oregon. Herman V. Schreiber. (Abstract of paper read before the National Assoc. of Cement Users.) (86) May 8.
- Failure of the Dalton Concrete Core-Wall Dam, Mineville, N. Y.* (13) May 9.
- Water Waste Surveys at Chicago.* (13) May 9.
- Two Rebuilt French Pumping Stations.* C. A. Tupper. (13) May 9.
- A 1,300,000-Gallon Concrete Reservoir, Design, Construction and Cost of the New Structure in Webb City, Missouri.* E. W. Robinson. (14) May 11.
- Large Hydroelectric Developments of the New Zealand Government. (27) May 11; (26) Apr. 26.
- A Concrete Water Tank. (14) May 11; (86) May 22; (87) June.
- The New Hydroelectric Power Plant at Shawinigan Falls. (14) May 11.
- The Evansville Water Filtration Plant; a 12,000,000-Gal. Filter Plant Resting on Reinforced Piles Provided with One to Five Hours' Storage in the Settling Basins.* (14) May 11.
- The Design and Cost of the Permanent Hypochlorite Disinfecting Plant at International Falls, Minn.* J. A. Childs. (86) May 15.
- Methods of Sinking Shafts in Rock for the Rondout Tunnel of the Catskill Aqueduct.* (86) May 15.
- An Accident to the Paving of Owl Creek Dam, Belle Fourche Irrigation Project, South Dakota. (13) May 16.
- 140 000-Volt Power Transmission. (Au Sable Hydroelectric Plant).* (13) May 16.
- Water-Softening Plant for 10,000 Gallons per Hour.* (11) May 17.
- Experimental and Permanent Plants for Applying Bleach at Kansas City, Mo.* Burton Lowther. (14) May 18.
- Filtration Results at Louisville. (14) May 18.
- Anchoring the Face Slabs of the Belle Fourche Dam. (14) May 18.
- Corrosion of Artesian Well Casing in New South Wales. (14) May 18.
- Beam and Slab Construction for Facing Reservoir Slopes.* (14) May 18.
- The Lahontan Dam on the Truckee Carson Irrigation Project.* (14) May 18.
- Construction of the Minneapolis Filters.* W. N. Jones, Assoc. M. Am. Soc. E. (14) May 18.
- A Review of Masonry Dam Design and Construction Illustrated with Cross-Sections of Forty Notable Dams.* Edward Wegmann. (Abstract of paper read before the Am. Soc. of Eng. Contrs.) (86) May 22.
- The Construction of La Boquilla Dam, Mexico: Difficulties Due to Revolution.* Wm. B. Fuller. (86) May 22.
- The Hydraulic Ram: Its Possibilities of Development and Use.* Stirling B. Hill. (Abstract of paper read before the Pacific Northwest Soc. of Engrs.) (96) May 23.
- Water Rate Regulation in Wisconsin. George C. Mathews. (Abstract from *Public Service Regulation*.) (13) May 23.
- Report on the Sanitary Efficiency of the Philadelphia Water Works. (13) May 23.
- The Flow of Water Through a Porous Medium. L. R. Balch. (From the *Wisconsin Engineer*.) (96) May 23.
- Protecting Pipe Lines Against Alkali. C. P. Bowie. (From *Western Engineering*.) (96) May 23; (86) May 15.
- Our Sources of Power: With Special Reference to Highland Water Power. Alex. Newlands. (Abstract of paper read before the Inverness Scientific Soc. and Field Club.) (22) May 24.
- Operating Results and Cost of Filtration at Springfield. (14) May 25.
- Some High-Power Hydraulic Turbines, the 9 000 and 22 500-H. P. Units for the Washington Water Power Company.* H. B. Taylor. (14) May 25.
- An Aqueduct Two Hundred and Forty Miles Long: How Steel and Concrete Siphons Will Supply Los Angeles with Water.* Burt A. Heinly. (46) May 25.
- Modern Hydraulic Turbine Practice.* (19) May 25.
- Circular Concrete Reservoirs at Cherokee, Iowa.* (14) May 25.
- The New Loch Raven Dam at Baltimore.* (14) May 23.
- The Peoria Electrolysis Decree, issued May 13 by Judge A. L. Sanborn. (14) May 25.
- The Design and Construction of the Municipal Water Works System at Mountain Home, Idaho, with Some Costs.* Edmund M. Blake. (86) May 29; (27) July 6.
- Tests of Pumping Engines and Auxiliary Machinery in the New Water Filtration Pumping Station, New Orleans, La.* L. E. Strothman. (86) May 29.
- The Hydro-Electric Project of the Mississippi River Power Company at Keokuk, Iowa.* David Taylor. (86) Serial beginning May 29; (67) May.
- Report on Toronto Water.* (96) May 30.
- Maintenance of High-Pressure Fire Service Systems. (Abstract of report presented at the annual convention of the National Fire Protection Assoc.) (13) May 30; (14) May 25.
- Combined Irrigation and Hydro-Electric Power Schemes. E. Kilburn Scott. A. M. Inst. C. E. (26) May 31.

*Illustrated.



Water Supply—(Continued).

- The Economy of Circular Reinforced Concrete Reservoir Construction.* Alexander Potter. (28) June.
- Some Water-Supply Problems Encountered in the Semi-Arid Regions of the United States. Clarence Goldsmith. (28) June.
- Methods of Thawing Frozen Service Pipes, and Distributing the Cost Thereof. (28) June.
- Water-Power Development in the South.* J. A. Switzer. (10) June.
- How the Water Emergency at Worcester, Mass., Was Handled in the Summer of 1911, Together with a Brief Description of Worcester Sources of Water Supply.* Frank C. Kimball. (28) June.
- Modern Methods of Water Supply. Clem Erisman. (Paper read before the Agri. Students Univ. of Ill.) (70) June; (101) May 31.
- Metering the Louisville, Ky., Water Supply. (60) June.
- The Austin Dam Failure.* Frank P. McKibben. (Paper read before the Boston Soc. of C. E.) (1) June.
- The Plant for Sterilizing the Croton Water Supply of New York City.* (14) June.
- The Storage Yard and Shops of the Detroit Waterworks Commission.* (14) June 1.
- The New Municipal Water Purification Plant at Niagara Falls, New York.* (14) June 1.
- The Water Softening Plant at Owensboro.* Philip Burgess. (14) June 1.
- The Louisville Water Filtration Plant.* (14) June 1.
- Calculating the Flow of Water in Pipes.* T. W. Holloway. (64) June 4.
- A Storage Battery Electric Locomotive for Tunnel Haulage in the Under City Tunnel, Catskill Aqueduct.* (86) June 5.
- The Design and Methods Employed in Constructing the Cooke Water Power Plant on the Au Sable River in Michigan. (Concrete Mixtures Used. Tests of Turbines. Camp Sanitation).* (86) June 5.
- The "Excess Lime" Method of Disinfecting and Softening Water. (13) June 6.
- The Arrowrock Dam, Boise Irrigation Project, U. S. Reclamation Service.* Chas. H. Paul. (13) June 6.
- Failure of the Lincoln Pond Dam near Westport, N. Y. (13) June 6.
- Electric Irrigation Pumping in Southern California.* (27) June 8.
- Power Development on East Canada Creek.* (14) June 8.
- Detecting Obstructions in Fire Service Mains. Frederick C. Moore. (14) June 8.
- Notes on Equipment for and Costs of Pumping for Irrigation Using Electric Power. (From *Journal of Electricity, Power and Gas*.) (86) June 12.
- Contamination of the Water Supply at Memphis, Tenn., by the April Mississippi Flood.* Paul D. Fuqua. (13) June 13.
- Special Check Valves on City and Factory Water Supply Interconnections, Auburn, N. Y.* J. Walter Ackerman. (13) June 13.
- Sanitary Survey of the Ottawa River.* James O. Meadows. (Abstract of report in Annual Report of Board of Health of the Province of Quebec.) (96) June 13.
- The Importance of Water Supply Inspection, as Illustrated by Enteritis and Typhoid Outbreaks at Rockford, Ill. Edwin O. Jordan. (13) June 13.
- The Williston and the Buford-Trenton Electric Irrigation Projects.* C. P. Eldred. (27) June 15.
- River Regulation Forestry in the White Mountains.* (14) June 15.
- The General Design and Specifications for the Elevated Structural Steel Water Tower and Tank of 100 000 Gals. Capacity, Hamilton, Ill.* L. P. Wolff. (86) June 19; (96) June 27; (14) June 1.
- The Hydro-Electric Plant of the Sincoe Railway and Power Company.* (96) June 20.
- Methods of Alignment in Three Aqueduct Tunnels: Yonkers Pressure Tunnel, by James L. Davis; Van Cortlandt Pressure Tunnel, by Edward A. May; Wachusett Aqueduct Tunnel, by Arthur W. Tidd.* (13) June 20.
- A New Kutter Formula Diagram.* K. R. Kennison. (13) June 20.
- Timiskaming Dam Construction.* C. R. Coutlee. (Abstract of report to Department of Public Works.) (96) June 20.
- Developments on Spokane River, Wash.* (27) Serial beginning June 22.
- The Ocoee Hydro-Electric Development.* (14) June 22.
- Filtration Results at Albany. (14) June 22.
- The Air System of the Queen Lane Preliminary Filters.* Charles B. Buerger. (14) June 22.
- Lining Part of the Bonticou Grade Tunnel.* John H. C. Gregg. (14) June 22.
- The Water Purification Plant at South Milwaukee.* (14) June 22.
- The Water Supply of Joliet, Ill. Methods of Overcoming Difficulties Encountered in Sinking New Deep Rock Wells. H. A. Stevens. (Paper read before the Illinois Water Supply Assoc.) (86) June 26.
- The Design of the New Water Purification Plant at Fargo, North Dakota. (86) June 26.
- The Influence of Ice on Water Power Development. H. T. Barnes. (Abstract of paper read before the Canadian Elec. Assoc.) (96) June 27.
- Water Purification at Minneapolis.* J. Arthur Jensen. (13) June 27.
- Rapid Filters for Cheltenham Water Supply.* J. S. Pickering. (Paper read before the Inst. of Water Engrs.) (12) June 28; (66) June 11; (104) June 7.

*Illustrated.



Water Supply—(Continued).

- Predicting Water Supply for the Farmer.* J. Cecil Alter. (19) June 29.
 The Municipal Water-Works at Corning, California.* C. F. Braun. (14) June 29.
 Rapid Filtration for the Croton Supply to New York City. (14) June 29.
 Waterproofing a Reservoir Division Wall.* J. B. Landfield, M. Am. Inst. Min. Engrs. (14) June 29.
 The Selective Action of Bleach. Burton G. Philbrick. (14) June 29.
 Laying a Water-Works Intake Line in 65 Feet of Water.* (14) June 29.
 High-Pressure Water-Power Works.* L. Zodel. (75) July, 1911.
 Results of Experiments with Francis Turbines and Tangential (Pelton) Turbines.* Franz Prásil. (75) July, 1911.
 Hydro-Electric Development in Western North Carolina.* N. Buckner. (10) July.
 The Runaway Speed of Waterwheels and its Effect on Connected Rotary Machinery.* Daniel W. Mead. (42) July.
 Method and Cost of Constructing Six Small Tunnels in Earth and Rock, Chicago Aqueduct.* D. L. Reaburn. (86) July 3; (14) June 29.
 Method and Cost of Constructing Six Small Tunnels in Earth and Rock, Chicago Water Works. Myron B. Reynolds. (86) July 3.
 Methods of Combating Moss, Weeds and Burrowing Animals in Irrigation Canals. W. M. Wayman. (Paper presented before the Boise Conference of Operating Engineers for Irrigation Canal Systems Located in Idaho, Oregon and Washington.) (13) July 4.
 Softening and Purification of Water. (47) July 5.
 Head Increases in a Hydroelectric Plant at Eldora.* (14) July 6.
 Lake Coleridge Hydroelectric Plant in New Zealand. E. Parry. (14) July 6.
 A French Ultra-Violet Ray Sterilizing Apparatus.* Francis P. Mann. (14) July 6.
 Developments of the Great Falls Power Company Harnessing the Rainbow Falls of the Missouri River by 29-ft. Dam.* (27) July 6.
 The San Joaquin Hydro-electric Power Installation.* F. C. Perkins. (19) July 6.
 Friction Formulas for Commercial Pipe. Ira N. Evans. (64) July 9.
 Some Notes on the Cost of Electric Pumping for Irrigation. E. H. Williams. (Paper read before the N. E. L. A.) (86) July 10.
 The Toronto Water Chlorination Plant.* (96) July 11.
 New Waterworks for Stockport.* (12) July 12.
 Stourbridge and District Water Board's Undertaking. William Fiddian. (Paper read before the Inst. of Municipal and County Engrs.) (104) July 12.
 Bridlington Waterworks. Sidney Charlesworth. (Paper read before the Inst. of Mun. and County Engrs.) (104) July 12.
 The Self-Pollution of Water by Natural Growths.* J. H. Garrett. (Paper read before the Inst. of Water Engrs.) (104) July 5; (12) July 12.
 The Use of Copper-Sulphate in Purifying Water Supplies. George Embrey. (Paper read before the Inst. of Water Engrs.) (104) Serial beginning July 5; (12) July 12.
 Hydroelectric Plant at Estacada, Ore.* Edward A. West. (27) July 13.
 Flexible Supports for Overhead Transmission Lines.* Alfred Still. (27) July 13.
 Water Waste in Albany. (14) July 13.
 Deepening and Sealing a 20-Inch Well. William Fiddian. (Paper read before the Inst. of Mun. and County Engrs.) (14) July 13.
 Electrolytic Treatment of Water.* G. D. Van Arsdale. (16) July 13.
 The Baltimore High Pressure Fire Service. (Report of the National Board of Fire Underwriters.) (14) July 13.
 New San Joaquin Power Plant.* Howard H. Bliss. (64) July 16.
 The Design and Specifications of the Sacramento Water Supply Wood Pipe Line of the El Paso & Southwestern Ry. Co. in New Mexico. (86) July 17.
 Formula and Constants for Friction Loss in Dredge Discharge Pipes.* H. Berridge. (13) July 18.
 Irrigation Projects of the Canadian Pacific Railway Company in Alberta.* A. S. Dawson. (96) Serial beginning July 18.
 The Hydro-Electric Plant of the Adamello Electric Supply Co.* (73) Serial beginning July 19.
 The Derwent Valley Waterworks.* (12) July 19.
 Experiments on Concrete Water Barrels as Applied to Fire Protection of Railway Bridges. Hunter. (Paper read before the Eng. Assoc. of the South.) (15) July 19.
 Masonry Reservoir Dams: A Simple Formula for Their Design.* F. C. Uren. (Paper read before the Inst. of Mun. and County Engrs.) (104) July 19.
 A Compressed Air Tunnel Driven without a Shield through Wet Earth at Eastview.* (14) July 20.
 Methods and Cost of Constructing a Pumping and Lighting Station at Kilbourn, Wis.* R. G. Walter. (86) July 24.
 Arch Dam Design: The Constant Angle Arch Dam. Lars Jorgensen. (13) July 25.
 A Large Timber Bulkhead under 168-ft. Head.* Arthur W. Tidd. (13) July 25.

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Water Supply—(Continued).

- Reinforced Concrete Inverted Siphons on a Main Canal. (14) July 27.
 Violet Ray Sterilization of Drinking Water in Chicago.* (14) July 27.
 A Mammoth Norwegian Power Plant: Telemarken's Great Industry.* (46) July 27.
 Artificial Surf Baths.* (46) July 27.
 Some Notes on the Hypochlorite Treatment of Water. W. H. Dittos. (From *Bulletin* Ohio State Board of Health.) (86) July 31.
 An Economic Study of Water Pipe Line Materials Available for the Proposed Conduit at Port Arthur, Texas. C. C. Crew, M. Am. Soc. C. E. (Report to Utilities Comm., Port Arthur.) (86) July 31.
 Théorèmes Fondamentaux d'Hydraulique Fluviale. A. Merten. (31) Pt. 2.
 Note sur la Conduite d'Eau Suspendue de Feurs (Loire).* Betledier-Matibet. (43) Mar.
 Etablissement d'une Nouvelle Conduite d'Eau d'Avre, entre le Réservoir de Saint-Cloud et la Place des Ternes, à Paris.* Vibert and Dariès. (35) Serial beginning Apr.
 La Nouvelle Usine Elévaire des Eaux de Nîmes (Gard).* Déthiollaz. (33) June 22.
 L'Aménagement Hydraulique du Haut-Rhône Français: Transport Electrique de son Energie à Paris.* A. Dumas. (33) July 13.
 Ueber die Wasserwirtschaft in Mesopotamien in der Vergangenheit und über ihre Wiederbelebung in der Gegenwart.* Rudolf Tholens. (49) Pt. 4.
 Das Delphinpumpwerk und seine Anwendung.* Paul Kurgass. (48) Mar. 16.
 Versuche an einer Sulzerschen 300 pferdigen Dieselmotorenanlage mit Abwärmeverwertung.* J. Cochand und M. Hottinger. (48) Mar. 23.
 Ueber die Behandlung von Trinkwasser mit Chlorkalk.* L. Schwarz und G. Nachtigall. (7) Mar. 30.
 Die neue Wasserversorgung für Los Angeles.* Quedefeld. (40) Apr. 20.
 Einrichtung und Versuchsergebnisse des Turbinenlaboratoriums an der deutschen Technischen Hochschule in Brünn.* Viktor Kaplan. (Paper read before the Fachgruppe der Maschinen-Ingenieure.) (53) Apr. 26..
 Neue Methoden der Trinkwasserreinigung zur Wasserversorgung der Städte.* Alexander Swetz. (53) Serial beginning May 17.
 Ueber die Ausbildung von Rohrbogen.* A. Bühler. (52) June 8.
 Das Mündungsbecken der Newa als Vorfluter für die städtischen Abwässer St. Petersburgs.* Georg Wulff. (52) June 15.
 Die Konstruktion der Abzitzbecken: Ein Ueberblick 30 Jahre Abwasserreinigung. R. Hauptner. (7) June 15.
 Ueber die Wirtschaftspolitik von Wasserkraft-Elektrizitätswerken.* R. Rinkel. (41) June 20.
 Das neue Wasserwerk der Stadt Brandis. F. Salbach. (7) June 29.

Waterways.

- Chicago's Waterways in Their Relation to Transportation. George A. Zinn. (4) Apr.
 The French Bucket Dredger *Bassure de Baas*.* (95) May.
 Shell Suction Dredger Used in the Dutch Shell Lime Industry.* F. Muller Van Brakel. (95) May.
 Notes on Hydraulic Dredge Design.* M. G. Kindlund. (95) May.
 The Danish Suction Dredge *Graadyb*.* Axel Holm. (95) May.
 The Port of Southampton.* Mark Meredith. (10) May.
 The Hudson Bay Railway Project and the *Titanic* Disaster.* (13) May 2.
 The Movable Diversion Weir at Berembé, a Description of the Sluices and Wickets and Method of Operating Them.* (14) May 4.
 Replacing a Timber Ore Dock with a Concrete and Steel Structure.* (14) May 4.
 First Complete Lock Leaf in Place at Panama. (62) May 6.
 Largest Dredging Plant in the World. (13) May 9.
 The Irondequoit Creek Concrete Trough; the Reinforced Concrete Waterway Built on a High Fill to Carry the New York State Barge Canal near Pittsford.* H. J. Knoppel. (14) May 11.
 An Ocean Pier of Reinforced Concrete.* (14) May 11.
 Pier Work at Panama. (62) May 13.
 Concrete Mattress Bank Protection.* B. Okazaki. (13) May 16.
 The Atlantic Coast Waterway.* (13) May 16.
 Heating of Local Areas of Ground in the Culebra Cut. (14) May 25.
 Method of Facing and Capping with Concrete a Crib and Stone Dam.* Lieut.-Col. Lordly. (From *Contract Record*.) (86) May 29.
 Backwater Effects of Exposed and Submerged Dams on the Rock Island Rapids of the Upper Mississippi River.* Charles W. Durham. (86) May 29.
 Unit Costs of Work on the Panama Canal for First Three Months of 1912. (86) May 29.
 Stream Measurements. P. M. Sauder. (Abstract from Progress Report on Stream Measurements to Dominion Government.) (96) May 30.
 A Ferry-Boat Propelled by the Current.* C. E. Chappell. (13) May 30.

*Illustrated.



Waterways—(Continued).

- Livingstone Channel; Detroit River.* E. T. Lednum. (13) May 30.
 Commercial Results from the Improvement of a Tidal Creek for Navigation.* R. R. Raymond. (13) May 30.
 The Completion of Colombo Harbour, Ceylon.* (11) May 31.
 Mechanical Equipment of Sea Port and Inland Waterway Terminals.* H. McL. Harding. (95) June.
 Inland Water-Borne Commerce in the United States. John Ruddle. (95) June.
 Devouring a Hundred Tons of Mud per Minute, the United States Suction Dredge
New Orleans. (46) June 1.
 The Improvement of the Neponset River in Massachusetts. Edmund M. Blake.
 (14) June 1.
 Cost of 735,425 Cu. Yd. of Hydraulic Dredge Fill for the Extension of Lincoln
 Park, Chicago, Ill.* (86) Serial beginning June 5.
 Two Examples of Reinforced Concrete Canal Lock Construction in Russia.* (86)
 June 5.
 Reconstruction of Boulter's Lock.* (12) June 7.
 A Reinforced Concrete Oil Loading Dock.* (14) June 8.
 The Canal Wall Wash-Out at Ansonia.* (14) Serial beginning June 8; (13)
 June 20.
 Method of Constructing a Breakwater at Naples, Italy, Using Concrete Hollow Blocks
 Made of Puzzuolana-Portland Cement.* (86) June 12.
 A Motor-Operated Dredge in Coral Rock.* (13) June 13.
 On the Impounding of Waters to Prevent Floods. A. H. Purdue. (96) June 13.
 The Immingham Dock.* (12) Serial beginning May 17; (22) May 17; (11)
 June 14.
 Ferro-Concrete Sludge-Pumping Pontoon; Manchester Ship Canal. W. Noble Twelve-
 trees. (11) June 14.
 The Delta Dam and Storage Reservoir for Supplying Water to the Rome Summit
 Level, New York State Barge Canal.* Emile Low, M. Am. Soc. C. E. (86)
 June 19.
 The Little River Drainage Works in Missouri.* William A. O'Brien. (14)
 June 22.
 Combined Flood-Wall and Intercepting Sewer.* (14) June 22.
 A Pier Built on Cylinders Cast as Concrete Shells and Filled in Place.* H. L.
 Muchemore. (14) June 22.
 The Improvement of the Neponset River in Massachusetts. (13) June 27.
 A Summary of Eight Years' Work on the Panama Canal. (13) June 27.
 The Galveston Causeway.* Meigs O. Frost. (46) June 29; (14) July 13.
 Rebuilding a Railroad Coal Dock.* (14) June 29.
 Loss of Water by Seepage and Evaporation, Ferre Canal.* W. B. Gregory. (Paper
 read before the Louisiana Eng. Soc.) (1) July.
 The Plaquemine Lock.* Robert R. Ralston. (100) July.
 Federal and State Power over Harbor Lines. (100) July.
 The New Canalized Channels in the Detroit River.* James Cooke Mills. (10) July.
 Methods of Excavating Sub Aqueous Hard Rock in the Trollhattan Canal, Sweden.
 (86) July 3.
 The Great Mississippi River Flood of 1912. T. G. Dabney. (14) July 6; (13)
 June 13.
 The 50 000-Ton Ore Dock at Marquette.* (14) July 6.
 Some Examples of Tidal Marsh Land Reclamation: Structures and Cost.* (86)
 July 10.
 Accident to Gates of Lock 22, Welland Canal, near Thorold, Ont.* Emile Low.
 (13) July 11.
 U. S. Government Contract Dredging. (13) July 11.
 Sea Defenses at Lowestoft. G. H. Hamby. (Paper read before the Inst. of Mun.
 and County Engrs.) (14) July 13.
 Method and Cost of Constructing a Concrete and Steel Ore Dock for the Duluth &
 Iron Range R. R.* Leland Clapper. (86) July 17.
 Notes on Clay Packing for Canal Lining. (13) July 18.
 Effect of Storms on a Lake Breakwater.* L. W. Goddard. (13) July 18.
 The Panama Canal. (96) July 18.
 The 32 000-Ton Floating Dock for the Medway.* (12) July 19.
 The Lumber Dock at Balboa, Canal Zone.* George R. Goethals. (14) July 20.
 Dimensions for Canals of Heavy Traffic; a Summary of Practice in Leading Coun-
 tries. Alfred Noble, M. Am. Soc. C. E. (86) July 24.
 Methods of River Improvement by Regulation and Dredging—Possibilities of Reser-
 voirs. Wm. W. Harts. (Paper read before the International Congress of
 Navigation.) (86) July 24.
 Construction of Dry Dock No. 4, Brooklyn Navy Yard.* H. S. Rinker. (13)
 July 25.
 Repairing the Dam at Hatfield, Wisconsin.* (14) July 27.
 How Baltimore is Converting an Open River into a Parkway.* Leonard Keene
 Hirshberg. (62) July 29.
 Methods and Costs of Making the United States Improvements at Coon Slough
 on the Upper Mississippi River.* Charles W. Durham. (86) July 31.

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Waterways—(Continued).

A Combined Salvage and Testing Dock for Submarine Boats.* Robert G. Skerrett. (95) Aug.

Redressement de l'Escaut en Aval d'Anvers: Note sur le Nouveau Projet du Gouvernement. C. J. van Mierlo. (31) Pt. 2.

Le Canal de Panama; Historique, Description, Etat Actuel des Travaux, Conséquences Economiques. A. Dumas. (43) Mar.; (33) Serial beginning May 25.

Note sur l'Utilité d'une Concavité du Plafond d'un Canal.* Galliot. (43) Mar.

Note au Sujet des Blocs Artificiels en Béton Employés au Port de Ténès. Raby. (43) Mar.

Un Volcan sous le Canal de Panama. L. de Pulligny. (43) Mar.

Réfection des Maçonneries du Souterrain de Mauvages sur le Canal de la Marne au Rhin.* F. Launay. (43) May.

Note sur les Travaux en Cours et en Projet au Port de Saint-Nazaire.* Ed. Epinay. (43) May.

Matériel de Dragage de Canal. Galliot. (43) May.

Projet de Loi relatif à l'Amélioration du Cours de l'Escaut entre Anvers et le Kruisschans et aux Travaux Qui en Sont Conséquence. Verhaegen. (30) June.

Projet de Rectification du Cours de l'Escaut entre Anvers et le Kruisschans.* (33) June 22.

Les Travaux d'Aggrandissement et d'Amélioration du Port du Havre.* Ch. Danten. (33) June 29.

Die Einwirkung der Oder, besonders ihrer Hochwasser, auf das Stettiner Haff. Karl Fischer. (40) Mar. 30.

Die Bulbeisendecke im Neubau des Schuppens am Magdeburger Hafen zu Hamburg.* G. Kaufmann. (78) Serial beginning Apr. 1.

Ueber die Standsicherheit von Bohlwerken. E. Jacoby. (52) Serial beginning Apr. 30.

Die Arbeit der Schelde-Kommission 1907-1911 und der neue Regierungs-Entwurf für die Schelde-Regulierung.* O. Franzius. (51) Serial beginning June 26.

*Illustrated.